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THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

JAMES W. WHITE, M.D., D.D.S.

Observe, Compare, Reflect, Record.

VOL. XXV.

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CONTENTS OF VOL. XXV.

ORIGINAL COMMUNICATIONS.

CLINICAL REPORTS.

PROCEEDINGS OF DENTAL SOCIETIES.

EDITORIAL.

BIBLIOGRAPHICAL.

OBITUARY.

PUBLISHER'S NOTICES.

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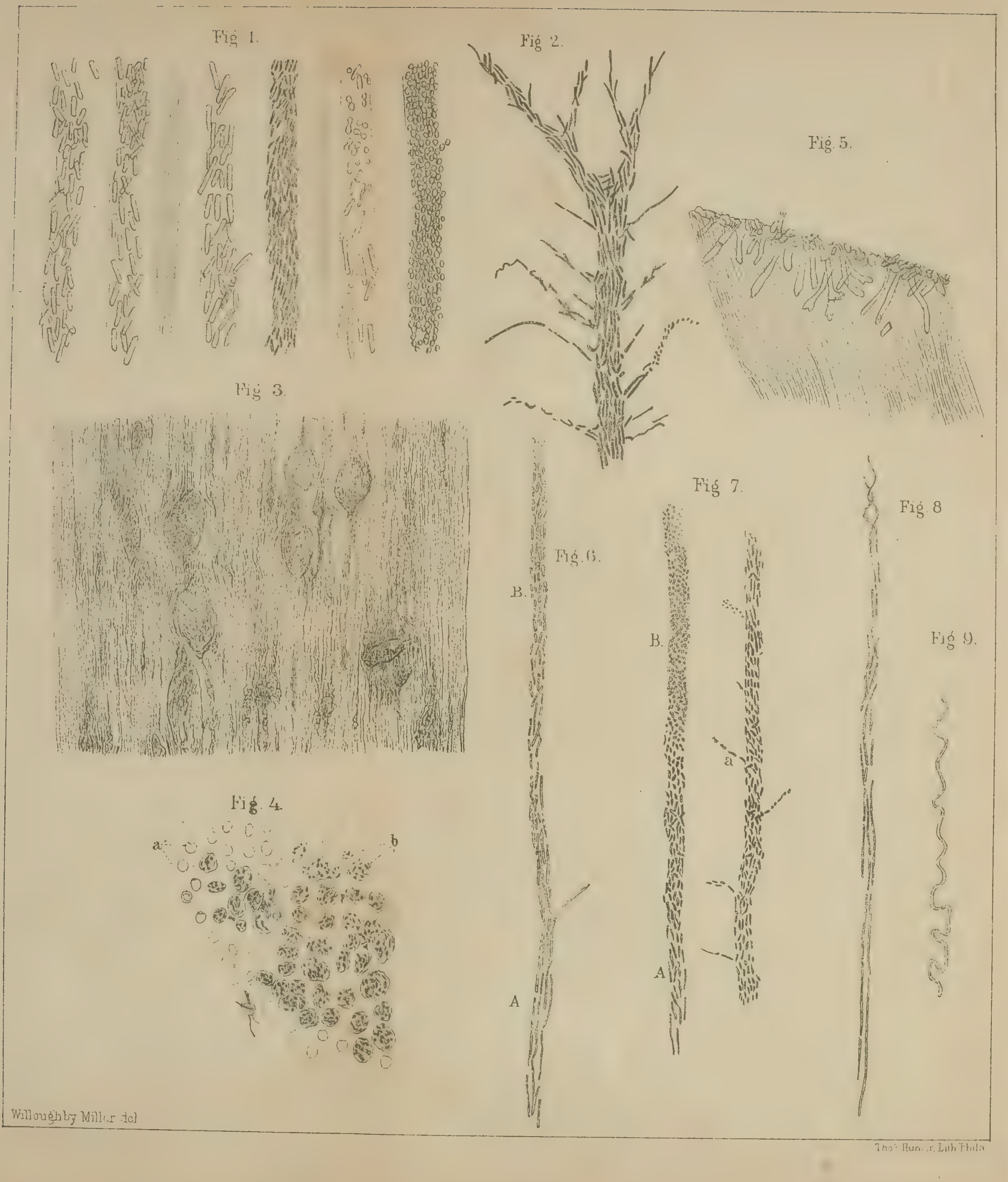

Thos Hunter, Lith Phila

THE

DENTAL COSMOS.

VOL. XXV. PHILADELPHIA, JANUARY, 1883. No. 1.

ORIGINAL COMMUNICATIONS.

AGENCY OF MICRO-ORGANISMS IN DECAY OF HUMAN TEETH.

BY W. D. MILLER, BERLIN, PRUSSIA.

(Read before the American Dental Society of Europe, at Ostende.)

As early as the year 1846 Facinus is said to have entertained the idea that caries of the human teeth was in some way influenced by the lower forms of life which may always be found in the oral cavity. It was not, however, till 1867 that an attempt was made by Leber and Rottenstein* to determine the exact nature of this influence. These authors came to the conclusion that the action of an acid or acids, was not sufficient to explain all the phenomena associated with caries of the teeth, but that "the elements of the fungus (leptothrix) easily work their way into the dentinal tubules, which they expand, and thereby assist the penetration of acids into the deeper parts."

F. Y. Clark† believes decay of the teeth to be produced by what he calls dental bacteria, which he describes as being "of a half-U shape, from one and a half to three micrometers long, by about one-half wide," and as having "an almost imperceptible screw-like motion."

A. Weil‡ is of the opinion that the leptothrix bores directly through Nasmyth's membrane and then into the enamel; he doubts very much whether certain acids, principally lactic acid, can account for the whole process. Arthur S. Underwood and W. Y. Mills consider that caries, as well as suppuration of the pulp and alveolar abscess, depends upon the presence and proliferation of micro-organisms. These organisms attack first the organic material, and feeding upon it create an acid, which removes the lime-salts.

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* Untersuchungen über Caries der Zähne, Berlin, 1867.

† Johnston's Dental Miscellany, 1879, p. 447.

‡ Vortrag gehalten in der Sitzung des ärztlichen Vereins zu München, 1880.

However much opinions may differ as to the etiology of caries of the teeth, it is a theory pretty generally accepted, that the first stage of the caries consists in a decalcification of the hard tissues of the tooth by certain acids which come in contact with them in the mouth. Numerous experiments were long ago made by Frerichs, Maly, and Donath, to determine the solubility of lime-salts, especially phosphate, in solutions of glutin, salts, etc., and attention has lately been called to the fact (by Prof. Mayr) that though fresh egg albumen is alkaline, it contains lime-salts in solution; that sugar will dissolve carbonate and hydrated phosphate of lime; and that chloride of ammonium will prevent the precipitation of carbonate of lime in analyzing for alkaline earths; that is to say, certain neutral and even alkaline substances have the power of dissolving or at least of holding lime-salts in solution.

It is well to bear these facts in mind, but I think we should not place too much weight upon them. Solubility of lime-salts and solubility of tooth-substance are not exactly identical, and Magitot has determined by experiment that neither sugar as such nor chloride of ammonium has the power of extracting the lime-salts from the tooth. The same, so far as we yet know, may be the case with the albuminoids.

I confess that the possibility of a certain part in the decalcification being performed by non-acid substances is not to be excluded. At the same time, I am not aware of a single alkaline or neutral substance which has been shown to have the power even in the slightest degree of extracting the lime-salts from the tooth; there are, on the other hand, at least a score of acids possessing this power in a high degree to be met with in the oral cavity, under varying conditions. Consequently, until some one by facts establishes a better theory, we must look upon the theory of decalcification by acids as the accepted one. A question which continually suggests itself to me in practice, and which I at present will not attempt to answer is, whether a decalcification in the sense of resorption of the lime-salts may not take place under the influence of external agents through the medium of the dental pulp. Ribbert (Virchow's Archiv. Bd. 80, S. 436) records observations on a form of senile osteomalacia in which the first step is a disturbance in the nutrition of the bone; this is followed by a chemical transformation (Umsetzung) of the basis-substance, diminution of the glue-giving substance, loosening and separation of the lime-salts from the glue-giving substance, and their solution in the fluids of the body. Can a similar process be concerned in decalcification of the teeth?

There is no difficulty in accounting for the source of the acids concerned in the caries of the teeth. The saliva is impregnated

with acids in various special and general disorders of the system; acid is brought into the oral cavity with the food and in the administration of medicines; but by far the greater part in the decalcification is to be attributed to those acids which are produced within the mouth by fermentation, viz., lactic, acetic, butyric, etc. A mixture of 68.0 grams saliva + 1.0 bread + 0.5 meat + 0.5 sugar, kept for forty-eight hours at the temperature of the human body, generated more than sufficient acid to decalcify the entire crown of a molar tooth.

Pieces of sound dentine, placed in a mixture similar to the above, became in ten days decalcified to the depth of half a millimeter.

When a like mixture with the addition of 0.2 gram pulverized dentine was allowed to stand for eight hours at 38° C., and then filtered, the filtrate gave with oxalate of ammonium a heavy precipitate of oxalate of lime. Numerous experiments of this nature showed a constant and powerful generation of acid, wherever particles of food, especially bread, remained for a few hours in contact with saliva at the temperature of the human body. The conditions present in the experiments may always be found in the human mouth. Portions of food remain lodged between the teeth, or in fissures and depressions in the teeth themselves, or in cavities of decay, and lead to the production of acids sufficiently strong to at once attack the teeth.

In the last few months I have examined hundreds of cavities in which particles of food were found, and have in very few cases failed to detect an acid reaction, even though the saliva as it issued from the ducts, or as found free in the oral cavity, might be neutral or slightly alkaline.

The general impression that these acids are produced by the fermentation of meat in the oral cavity is wrong. Meat of any kind, either raw or cooked, kept in contact with saliva at the temperature of the human body never shows more than a slight acid reaction, and in the course of ten to twelve hours becomes invariably neutral or even alkaline. On the other hand, bread, potato, rice, or other starch-containing foods under the same conditions, produce a decided acid reaction, distinctly evident both to taste and smell, and maintain it for weeks. We therefore should not be surprised to find now and then even an alkaline reaction in cavities of decay. This would occur when they become filled with meat *exclusively* which was allowed to remain in place for some twelve or fifteen hours.

Enamel contains only three and a half per cent. of organic matter, therefore the very delicate net-work, which remains after decalcification, falls to pieces of itself or is torn away by the action of mastication. Decalcification of the enamel signifies consequently total destruction of that tissue. Dentine, on the other hand, contains

twenty-three per cent. of organic matter, and after the lime has been extracted there remains a tough, spongy mass, consisting of the organic part of the basis-substance of the membranes surrounding the dentinal tubules and the contents of the latter.

Under certain rare conditions a reaction may now take place accompanied by a re-deposition of lime-salts, a hardening of the softened dentine, and a permanent cessation of the carious process. The ordinary course of the disease is, however, this: enormous masses of fungi, leptothrix-threads, bacilli, micrococci, etc., work their way into the deeper parts of the softened dentine, stop up the dentinal tubuli, or destroy the dental fibrils; the outer layers of dentine consequently receive no further nourishment, lose all vitality and fall a prey to putrefaction.

The presence of micro-organisms within the substance of the decalcified dentine may be easily demonstrated by any one possessing a good microscope (capable of magnifying 600 diameters). From a freshly-extracted carious tooth, remove carefully all remains of food in the cavity, as well as the outer layers of softened dentine. Then with a clean instrument take a small piece from the underlying dentine; place this for a moment in a drop of distilled water upon an object-glass which has been purified by heating; a microscopic examination of the water will then reveal such numbers of bacteria and micrococci that not the slightest doubt can remain as to their existence in the dentine itself. Again, place a freshly-extracted carious tooth in concentrated carbolic acid, and allow it to remain there for one hour; at the end of this time wash it carefully in distilled water, remove all loose decayed matter from the cavity of decay, as well as the outer layers of dentine, and portions of dentine then taken from the cavity will be found to be quivering with living organisms. This experiment shows conclusively that the fungi had penetrated so deeply into the tissue of the tooth as not to be reached by the acid in the space of an hour.

The leptothrix-threads contain granules of starch, and give, consequently, with an acid solution of iodine, a blue to violet color. This reaction, which was first used by Leyden and Jaffé for determining the presence of these organisms in the sputum of persons suffering from gangrene of the lungs, may be applied to carious dentine in the following manner: A very dilute solution of iodine in iodide of potassium is rendered acid by adding a drop of acetic acid. In this solution are placed microtome- or razor- sections of carious dentine. Immediately a deep blue or violet color will appear on the margin of the section corresponding to the surface of the cavity, and will be seen to run along the course of the dentinal tubuli, sometimes to a depth of two or more millimeters. This coloration is due to the

presence of the elements of the leptothrix buccalis in different stages of development within the dentinal tubules.

I have in my possession over one thousand sections of carious dentine, in not one of which bacteria and micrococci are missing, whether the sections were made from teeth containing live pulps, or whether the pulps were dead, or whether the caries was produced artificially out of the mouth. My specimens were prepared in the following manner: from a freshly-extracted carious tooth a concavo-convex disk of softened dentine is removed by means of a spoon-shaped excavator. This is cut at once on the freezing microtome. After the sections have then remained for an hour in absolute alcohol, they are ready for staining in magdala, fuchsin, or methylene blue. In specimens prepared in this manner and examined with Zeiss's oil immersion and Abbé's illuminating apparatus without blend, the tissue of the tooth should be almost or absolutely invisible (Fig. 1); if this is not the case the specimens have either been overstained, or the excess of coloring matter has not been properly removed. Examined with the naked eye, or with a very low magnifying power, the preparations usually show a deep coloring on the outer border, which grows gradually less intense towards the inner border, the latter being sometimes altogether unstained, indicating a decrease in the number of bacteria as the depth below the surface increases. Under the power of 150 diameters and at a depth of from one to two mm. beneath the surface numerous oval figures or spaces are to be seen, from ten to one hundred micrometers in length and from five to fifty in breadth (Fig. 3). These places are always found crowded with micro-organisms, and are due to one of the dental tubuli becoming expanded to many times its original diameter and pressing apart the neighboring tubuli on each side of it. In the larger spaces one or more of the central tubules, together with the intervening basis-substance will be found to be entirely destroyed, giving rise to a cavity within the substance of the dentine.

A section of carious dentine made at right angles to the direction of the dentinal tubules shows, under 300 diameters, those tubules which are filled with micro-organisms, to have a diameter from one to four times that of the normal tubule, and often two or more converted into one by the destruction of the intervening basis-substance (Fig. 4). This melting together of the tubules increases as we near the outer border of the specimen (*i. e.*, the surface of the cavity), until it is no longer possible to distinguish the separate tubules (Fig. 4). If we now continue the examination with a power of from 1000 to 1500 diameters (for this purpose the homogeneous immersion with Abbé's illuminating apparatus should be made use of), we will find the outer border of the preparation to consist of débris

of the decomposing dentine filled with enormous masses of micrococci, bacilli, and leptothrix-threads. The latter are by no means always found along the whole margin; on the contrary, in many preparations they are wanting. They do not, as a rule, penetrate the dentinal tubules to any considerable distance, except when the latter are distended by bacilli and micrococci, or where the dentine has already become partially decomposed. The leptothrix-threads sometimes present one end curved after the manner of a spirillum. On examining a zone slightly below the outer margin, we will find the tubules filled almost exclusively with bacilli and micrococci (Fig. 1). As we go further from the outer border the number of bacilli gradually decreases, until in most preparations they give way entirely to micrococci, which in like manner diminish in number as they near the inner margin, where, if the section comprises nearly all the softened dentine contained in the cavity, only a few tubules will be found to contain organisms.

The "dental bacterium" described by Clark, and which he believes to be the chief agent in caries of the teeth, does not exist in the dentinal tubuli. No more do vibriones, which have been looked upon as very dangerous to the teeth, have the power of penetrating the tubuli; bacilli and micrococci, on the other hand, enter their finest branches, producing the appearance of a very delicate-colored net-work connecting the adjacent tubuli and ramifying through the basis-substance (Fig. 2). Neither the bacilli nor the micrococci have the power of penetrating or boring *separately* through the basis-substance, and can only escape from one tubule to a neighboring one by a complete destruction of the membranes and the basis-substance. In the separate tubuli is frequently to be seen a gradual change from leptothrix-threads to long bacilli, from long to short bacilli, and from the latter to micrococci.

Besides this there obtains in some sections a definite arrangement of these forms in zones of the above succession. We obtain, therefore, essentially the same figures which Zopf obtained for the zooglæa ramigera. In the Figs. 6, 7, 8, may be seen the gradual transition from one form to the other. The leptothrix-threads are sometimes twisted after the manner of a spirillum (Fig. 9). Since this regular succession, the existence of which has been confirmed by examination of my preparations by many competent microscopists, cannot be accounted for by the successive invasion of completely heterogeneous fungi, we may have a case before us in which one fungus can produce entirely different forms of development, namely micrococci, long bacilli, short bacilli, leptothrix, and screw-forms. We consequently have a further confirmation of the theory of Billroth, Nägeli, Cienkowski, and Zopf.

I have been able to obtain sufficiently thin sections of fresh dentine in an advanced state of decomposition, to observe and study the action of the fungus. In such preparations the tubules are seen to be filled with micro-organisms in active motion. They are entirely limited in their movements by the walls of the tubuli, but at certain places, probably where the tissue presents less resistance, they crowd together in large masses, distend the tubules, and cause the gradual disappearance of the basis-substance. In this manner originate numerous microscopic holes and fissures in the dentine, and these increase in number and size until the tissue loses all trace of structure or disappears entirely. The process in the mouth is probably very much the same.

The masses of micrococci and bacilli which penetrate the dentine stop up the tubules, and must lead, sooner or later, to the death and destruction of the dentinal fibrils, in consequence of which the outer layers of the dentine lose their nutritive connection with the pulp and die from lack of nourishment.

From this point on the process is very similar to the putrefaction of a piece of decalcified dentine out of the mouth. In this stage, however, the leptothrix-threads themselves seem to play a more important part, in many cases penetrating the *superficial* layers of dentine, cleaving it in all directions and preparing it for the decomposing agents. Whether the leptothrix-threads themselves assist in the final decomposition of the tissue, is a question which cannot as yet be answered.

Experiments demonstrating the direct effect of bacteria upon decalcified teeth have not been made in the mouth, on account of the almost absolute impossibility of decalcifying the teeth on the one hand, and of making the necessary test experiments by excluding bacteria from the mouth on the other. Experiments made out of the mouth show that freshly-extracted teeth, which have been decalcified by being left for some weeks in a mixture of bread and saliva, and afterwards infected with carious dentine, go through a form of caries, and present microscopic changes very similar to those which occur in the mouth. Moreover, it is the universal testimony, gathered from hundreds of thousands of experiments in practice, that softened dentine may be left in the bottom of the cavity in a carious tooth and will not decay, provided that it is thoroughly disinfected and the cavity closed sufficiently air- and water-tight to prevent its reinfection from without. It is equally well known that if decalcified dentine is left in the bottom of a cavity without being thoroughly disinfected, or if the filling is so poorly made that moisture may find access to such dentine, then the decay will go on under the filling. Further, softened dentine may be left in a cavity with im-

punity when the filling-material itself possesses antiseptic properties. These facts, taken together with the anatomical changes above described, lead us directly to the conclusion that the second stage of caries of the human teeth is in part, at least, to be attributed to the action of micrococci and bacilli.

There remain still to be answered the questions: Do bacteria ever penetrate directly into perfectly-sound enamel or dentine, and do they perform any part in the decalcification?

I have already referred to the gradual diminution of the bacteria in number, as we go from the outer to the inner margin of the preparation (*i. e.*, from the surface to the deeper parts of the dentine), till at the inner border but few or none of the tubuli are found to be infected. This fact, which leads us to the conclusion that the micro-organisms cannot penetrate beyond that point to which the tissue has been softened by the action of acids, may be readily confirmed by the examination of the softened tissue taken from different depths of a cavity of a carious tooth. The same gradual diminution in the intensity of the infection will be observed, and at the boundary between healthy and softened dentine, it is, with the proper precaution, always possible to obtain dentine which has evidently been subjected to the action of acids, and which yet does not contain any bacteria.

The facts necessitate a negative answer to the first question. In order, however, to confirm the conclusion, a great number of sections of carious teeth were made, including both the carious and the sound portion. These were ground sufficiently thin to admit of examination with a power of from 1000 to 1500 diameters. The microscopic examination showed the decayed part to be filled with bacilli and micrococci, but in not a single case have I found them to pass beyond the softened (carious) into the sound dentine.

Teeth of poor structure always contain numerous irregular microscopic cavities (interglobular spaces) in which a deposit of lime-salts has not taken place. These cavities frequently communicate with one another, and through cracks or fissures with the surface of the tooth, in which case they may become filled with micrococci. The latter are completely confined within the limits of the cavities and do not penetrate the normal dentine. Again, microscopic sections made from pieces of sound dentine, which had remained for four months in contact with carious dentine under favorable conditions of warmth and moisture, failed to reveal an invasion of the fungi.

We now come to the second question: Have the organisms found in and upon decayed teeth the power to effect the decalcification of the same? In reference to this question the following experiments were made:

1. Pieces of perfectly sound dentine, handled with great care, so as to be kept as free as possible from all foreign matter, were placed in small vials and covered with a drop of distilled water. These were then infected with leptothrix, bacilli, and micrococci from decayed tooth-bone, and kept at a temperature of 35 to 38° C. If now the organisms were capable of decalcifying the tooth-substance we should expect: 1, a softening of the tooth-bone; 2, the infection of the softened part; 3, an increase in the number of bacteria and cloudiness of the liquid, and, 4, since the bacteria could accomplish the decalcification only through the generation of an acid, we would expect an acid reaction of the liquid.

These flasks were observed for four months. For the first few days an increase in the number of bacteria was apparent, but as soon as all matter upon the surface of the pieces and at the exposed ends of the dentinal fibrils was consumed, the numbers diminished, and at the end of the four months only now and then a micrococus was to be seen. A cloudiness of the liquid did not occur, an acid reaction could not be detected, nor were the pieces of dentine changed either microscopically or macroscopically.

2. Similar pieces of sound dentine were kept for the same time under the same conditions with the addition of several pieces of decaying dentine, so as to insure the presence of great numbers of bacteria. The result was the same as in the first experiment. Microscopic sections failed to reveal the presence of bacteria.

3. In each of forty flasks with long necks, were put 0.2 gram of finely-pulverized tooth-substance, with 10.0 grams of distilled water. Twenty of these were at once richly infected with leptothrix-threads, bacilli, and micrococci; twenty others, after the necks had been drawn out to a fine tube, were boiled for ten minutes and hermetically sealed at the moment of removal from the fire. After three weeks the contents of the flasks were filtered by passing several times through four thicknesses of Swedish filter-paper. If the micro-organisms had the power of decalcifying tooth-bone,—this power would be many hundred times increased by the fine state of division to which the substance was brought,—we would be able to detect the lime in the filtrate. Using the most delicate chemical reagent known for lime (oxalate of ammonium), I was not able to establish any action whatever on the part of the micro-organisms in decalcifying tooth-bone. A very slight cloudiness was in some cases perceptible on adding the oxalate of ammonium. This occurred, however, as often where the organisms had been excluded as where they were present, and cannot be attributed to their action. If 0.2 gram of the same pulverized tooth-substance is added to a mixture of saliva and bread, which has stood for six or eight

hours at 38° C., not two weeks, but twenty minutes will be sufficient to effect the solution of enough lime to be easily detected in the filtrate.

From this fact we may draw the conclusion that, whatever power of decalcification the micro-organisms associated with decay of the teeth, may possess, it is, when compared with the power of acids generated by fermentation, so small as to merit very little consideration.

Whether or not the leptothrix fungus in any of its forms has the power of generating acids, could only be determined by pure cultivation. I have found that flasks containing carious dentine in water or saliva, kept at the temperature of the human body, invariably become alkaline, unless other fungi, the germs of which are frequently found in the human mouth, become developed in the solution. The pure cultivation of the leptothrix buccalis is an exceedingly difficult task, and has not, so far as I am aware, been accomplished by any experimenter.

Practical experience teaches us, moreover, that the fungi of tooth-caries can have little to do with the decalcification of the teeth. It is well known that tartar is filled with masses of leptothrix in all its forms of development, and teeth imbedded in tartar we would expect to find bored through and through by the organisms continually acting upon them. But if we remove the tartar from a tooth which has been enveloped for forty years, if you like, we will find the tooth perfectly free from caries.

I have found, moreover, in the mouths of dogs and cats and other carnivora, especially when they were suffering from pyorrhea alveolaris, such masses of leptothrix as I have never met with in the human mouth, without a trace of caries and without an acid reaction.

I have in my investigation met with only one kind of fungus, which beyond all doubt has the power of boring directly into sound dentine. This is not, however, a Spalt-, but a Sprosspilz.* This fungus is often found in the human mouth, and its presence is always associated with an acid reaction of the liquid immediately surrounding it. It appears to generate an acid upon its growing extremity, by means of which it eats its way directly into the substance of the hardest dentine, not into or in the direction of the dentinal tubules, but invariably cutting the matan angle, any where between 0 and 90 degrees C. (See Fig. 5.) I have fifteen specimens, some obtained from teeth which had been just extracted, some from human teeth which had been inserted upon pivots, and others from pieces of dentine which

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* A "Spaltpilz" reproduces itself by division, a "Sprosspilz" by budding. I am unable to give the corresponding English terms.

had lain in culture-flasks. Some of the specimens are bored through and through by the fungus; in fact, almost entirely consumed by it, and in many cases where the fungus has been cut at right angles it has fallen out leaving a lumen in the preparation. This fungus when found in the human mouth undoubtedly aids the carious process; 1, by producing a strong acid reaction upon the tooth; 2, by boring directly into the tooth; but so far as my observation at present extends, I would not be willing to say that its occurrence in the human mouth was general enough to make it an important factor in the caries of the human teeth. The fungus apparently generates the acid only at the advancing extremity, since it completely fills the lumen in which it lies.

I have been led to the conclusion through my experiments, that the micro-organisms associated with caries of the dentine are not a factor of any importance in the production of either pulpitis, periodontitis, or alveolar abscess; but I hope to consider this point on another occasion. The general results which I have arrived at may be summed up in the following paragraphs, partly in accordance with and partly contrary to the commonly-accepted views:

1. The first stage of caries of the teeth, *i. e.*, the extraction of the lime-salts, is for the most part caused by those acids which are generated in the mouth by fermentation.

2. Decalcification of the enamel signifies total destruction of that tissue; of the dentine there remains after decalcification a tough, spongy mass, which becomes subject to the invasion of enormous numbers of fungi (leptothrix-threads, bacilli, micrococci, etc.).

3. The leptothrix-threads are found, with rare exceptions, only upon the surface, or in the superficial layers of the softened dentine, and appear to take but a small part in the invasion. The bacilli, on the other hand, penetrate far into the dentine, even into the finest branches of the canaliculi. Micrococci penetrate furthest.

4. In the separate tubules is frequently to be seen a gradual change from leptothrix-threads to long bacilli, from long to short bacilli, and from the latter to micrococci.

5. The fungi produce anatomical and pathological changes in the deeper layers, stop up the canaliculi, and necessarily lead sooner or later to the death of the dentinal fibrils. The outer layers of dentine, thereby deprived of nourishment, die and fall a prey to putrefactive agents.

6. The invasion of the fungi is always preceded by the extraction of the lime-salts.

7. The fungi have not the power either to penetrate or to decalcify sound dentine, so that the infection of a perfectly sound tooth by a carious one seems to be excluded.

8. We may accordingly look upon caries of the teeth as consisting of three stages: (1) decalcification; (2) infection and devitalization of the decalcified dentine; (3) putrefaction of the devitalized dentine; though it would not be easy to say just where one stage ceases and the other begins.

9. I have in a number of cases been able to establish the participation of the fungus saccharomyces mycoderma (?) in the carious process.

I do not, however, wish to be understood as saying, that acids or pathogenic bacteria, or putrefactive bacteria, or all together, are the sole and only cause of decay of the human teeth. What I am prepared to say is this, that in my opinion, there is not a single case of caries in which micro-organisms do not play some part, and that in the most cases they play a very important part.

Note.—I have adhered to the acid theory of decalcification in this article, not because I regard it as in any way competent to account for all the facts connected with the first stage of caries (*i. e.*, the softening of the dentine), but because it comes nearer to accounting for them than any other theory yet proposed. I wish also to designate by the term "decalcification" not necessarily the complete solution and removal of the lime-salts, but the breaking up of the bond of union between the lime-salts and the basis-substance, followed in most cases by the partial or complete removal of the salts, either in solution or otherwise.

Description of the Figures.

Fig. 1. A piece of carious dentine, the canaliculi filled with fungi, the tissue (examined by Abbé's illuminating apparatus) invisible. (Zeiss $\frac{1}{18}$ ocular 4.)

Fig. 2. A canaliculus, into the branches of which the fungi have penetrated. (Zeiss $\frac{1}{18}$ ocular 4.)

Fig. 3. Structural changes of carious dentine caused by fungi, principally micrococci. The portion represented lay $1\frac{1}{4}$ to $1\frac{1}{2}$ mm. under the surface. (Magnified 150 diameters.)

Fig. 4. A section cutting the canaliculi at right angles; *a*, normal tubules; *b*, tubules extended by fungi and melting together. (Magnified 1090.)

Fig. 5. A ground section of perfectly hard (not decalcified) dentine penetrated by a "Sprosspilz." (Magnified 105.)

Fig. 6. Transition from long to short bacilli.

Fig. 7. Transition from short bacilli to micrococci.

Fig. 8. Transition from leptothrix-threads to bacilli and screw-forms.

Fig. 9. A screw-like thread often found in the canaliculi. (Zeiss $\frac{1}{12}$ ocular 4.)

ATTACHMENT OF ARTIFICIAL CROWNS TO NATURAL ROOTS.

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(Read before the New York Odontological Society, October 17, 1882.)

Although this subject had been extensively discussed, yet many will agree with me that the problem had not been satisfactorily solved. The great value of pivoting operations has long been rec-

ognized, and has been one of the most important questions for the last thirty years. In looking over the dental journals we find a great many varieties of attachments for artificial crowns upon natural roots have been described. In order to get a clear idea of the importance of this problem, and to give due credit to those who have contributed to the general knowledge, I will, before entering upon the description of my method, give a brief sketch of a variety of processes, as published in the journals. Although there is a distinctive difference in these processes, they may be divided into two general classes.

The first, and doubtless the oldest method, is that which depends upon a central pivot of wood or metal, to hold the artificial crown in position.

The second class consists of methods in which, besides a central pivot a ring is fitted around the root, to increase durability and prevent fracture.

History.

The first who introduced the latter method to the profession was Dr. W. H. Dwinelle, who, in an elaborate article, published his invention in the *American Journal of Dental Science*, vol. v., page 278, April, 1855. I quote as follows: "Another method is to line a tooth, then solder a band of gold around it, so that it will correspond to the presenting outline of the root to be covered. * * * A gentleman of my acquaintance has, for several months past, worn an artificial cusp and crown of this general character upon a root which retains a living and healthy nerve. By accident the natural crown was broken off, but in such a manner as to leave a large portion of the central part of it covering the nerve, which protruded so far that, by cutting a groove around its base, it somewhat resembled an inverted cone; gold was packed around this until it nearly reached the outline of the root, when the prepared cusp and crown, which had been previously fitted, was secured to its place. The gold-bound cavity was then filled with gold, as described."

This article is illustrated by cuts, showing the several steps to be observed in the setting of these crowns.

In an article by Dr. W. N. Morrison, of St. Louis, in the *Missouri Dental Journal*, 1869, page 184, he gives a description of a new method of setting gold crowns, of which the following is an abstract. An impression of the remaining portion of the root is obtained, a metallic die representing the form of the crown constructed; over this a thin piece of gold is swaged, accurately fitted to the root and extending below the free margin of the gum, and after soldering a bar across the inside of this crown it is fastened to the root with cement.

Dr. Beers, of California, patented a method in 1873, which is described as follows: "Fit a stout gold band around the neck of a tooth; then strike up in a piece of lead a gold crown, the size required, and run gold solder into it, to make it strong; adjust and solder it on the gold band that fits the root. Screws with T-heads are then secured in the root-canal and the crown pressed in position with hard cement."

In vol. xxii. of the Dental Cosmos, page 463, 1880, Dr. Talbot, of Chicago, describes an improvement upon the Beers method by fitting a plate inside of the ring, penetrating this opposite the root canal and screwing it on the root, placing a layer of gutta-percha between root and cup. The gold crown is fitted either over or inside of this cup and also fastened with gutta-percha.

In the *American Journal of Dental Science*, vol. iii., page 497, 1853, Dr. A. T. Willard describes a method of pivoting. The root is cut level and below the gum, and prepared with an instrument which he calls a counter-drill. A smaller sized one is used next to cut into the inside of the root about one-sixteenth of an inch deep. The crown is prepared to fit the counter-hole in the root accurately, and has a wood pivot which is fastened in the root with mastic.

In the *American Journal of Dental Science*, vol. vi., page 24, 1856, Dr. John Coghlan, of Ireland, describes a capillary tube used in pivoting teeth. It was formerly applied instead of a solid gold pivot to facilitate the escape of gases and fluids from the root.

A method of pivoting teeth by Dr. T. J. Thomas is as follows: A square pivot of platinum-and-gold alloy is made by soldering two narrow pieces together at one end. The pivot is finished smooth and made accurately square. Thin platinum is bent around it, jointed and soldered. The root is prepared with under-cuts and drilled out largely in excess of the size of the pivot used. The square cylinder is fastened in the root with gold or amalgam, which, when hard, is filed smooth; a plate of soft gold is fitted to the margin of the root, and the pivot, after being placed in position is soldered to it. A plate-tooth is backed and fitted to the plate; both parts invested and soldered. The free ends of the pivot are bent apart before inserting.

In the Dental Cosmos, vol. ii., page 417, 1861, Dr. J. D. White describes his method: The root is enlarged for the reception of the pivot. A piece of hickory is perforated with a drill, and a gold wire forced into it; the wood condensed with a burnisher to fit the root. A natural or a porcelain crown is fitted to the root; the proper position obtained with a temporary pivot. The crown and pivot are inserted by setting a peg of wood against the cutting-edge and driving it home with a mallet without too much force. Plate-teeth

are used in the following manner: "Solder a strong plate to the tooth as a backing, and to this a round wire for a pivot; drill a piece of wood to fit the gold pivot; then dress this down so as to fit the hole in the root; place it in the root, keeping it dry; dress it even with the root, and place your tooth in, and the operation is complete." In cases where the root is much decayed, it is drilled out; a gold cylinder is screwed into it, and the groove between the margin of the root and the tube plugged with gold. The crown is subsequently set into this with a solid gold wire.

In vol. iii., page 614, 1862, DENTAL COSMOS, Dr. S. Richardson describes a method of using vulcanized rubber in pivoting teeth. An ordinary pivot crown is fitted to the root, leaving a space posteriorly between crown and root; the crown is attached to it with a temporary wood pivot, which is withdrawn, and soft wax interposed between the root and crown; this is pressed into the root to obtain an impression; the crown and pivot are again withdrawn; invested in plaster in such a manner as to be able to withdraw the wood pivot and remove the wax from the investment; soft rubber is now packed into the space, and a gold wire inserted to strengthen the pivot. It is then inclosed in a flask and vulcanized. Before inserting, gold foil is placed between the root and crown to make the joint perfect. By another method spring gold wire is incased in tin foil; a layer of rubber wrapped around it and vulcanized. The root must be prepared to receive the above pivot with its lining, which is forced into it. The fitting of the crown is the same as in the former method, except that no temporary pivot is used. The crown is fastened to the wire in the root with hard wax. It is withdrawn and manipulated the same as described before, except that the gold pivot is permanent, not being incased in rubber in the investment. To secure this tooth in the root the pivot is either split or flexed upon itself and then forced into the root. A plate-tooth may also be used with the above method. The root is prepared in the same manner as before; a plate-tooth backed with gold, waxed to the gold pivot, and carefully withdrawn; invested and soldered; then reapplied; soft wax pressed posteriorly upon the base of the root; this then removed and imbedded in plaster; rubber is packed into the space after removal of the wax, and the operation completed as in the former method.

In vol. v., page 218, 1863, DENTAL COSMOS, Dr. J. H. McQuillen describes the use of osteo-dentine in the setting of pivot teeth: In cases where the walls of the root are too thin to support a pivot, the root is cleansed from decay; filled nearly even to the top with osteo-dentine; a pivot tooth with wood pivot is pressed into the root. By this process the parts are firmly united.

In vol. vii., page 301, 1865, Dental Cosmos, Dr. C. E. Latimer, describes a method of pivoting. The nerve-canal of the root is enlarged and compactly filled with gold; a hole is drilled into the center, a little smaller in diameter than the pivot intended to be used; with a screw-tap the hole is prepared for the pivot, which consists of silver wire with a screw cut upon it; this is screwed into the root, projecting a little from the surface; around this and over the base of the root Wood's alloy is carefully worked, a rubber-tooth is fitted to the space, the metal moulded around the pins and finished to imitate the shape of the natural crown.

In vol. vii., page 361, 1866, Dental Cosmos, Dr. I. J. Wetherbee gives the following method of applying a common pivot-tooth: A screw is cut upon a gold pivot about one-third its length and firmly inserted in compressed hickory; the end which enters the crown is provided with a dovetailed slot, which is filled with wood so as to retain the crown in position. The pivot is then carried to its position in the root, and the space between the pivot and cavity filled with gold. A cylinder of wood is inserted in the crown, placed in position and forced into the root. By another method the porcelain tooth is made with a groove in the center of its posterior surface, with two platinum pins on either side, for the purpose of receiving a gold backing and cylinder, to be soldered and finished to represent the ordinary form of pivot-teeth. The cylinder may be round or square. The insertion of the pivot is the same as in the former process.

In vol. x., page 530, 1868, Dental Cosmos, Dr. M. L. Battle describes his method of mounting pivot-teeth. The root is prepared with under-cuts; a gold pivot fastened into it with gold; the tooth ground to fit the root, and left about one-twentieth of an inch shorter than the tooth next to it. Amalgam is packed around the pivot and over the surface of the root. The crown is then forced on until it has the proper length. The same may be done with a wood pivot.

In vol. xi., page 1, 1869, Dental Cosmos, Dr. E. Blake gives his method. A thin gold tube with a longitudinal slit is forced into the root, which has been prepared for this purpose. An ordinary pivot-tooth is used by adjusting a gold or platinum pivot in the pivot-hole and flowing in solder. A way which he considers better is to cap the end of the root with thin gold plate to be retained in place by a pivot attached to it. A plain plate-tooth is backed and soldered to this plate. Another plan is the adaptation of a hollow screw to the hole in the root; this is screwed into the root and the crown is attached as described before. When a root does not stand in its proper position, prepare the root with a tube; fit a pivot of gold;

cover the base of the root as before, only extending the gold over the gum to the place where the new tooth is required; and mount a plate-tooth on this base.

In vol. xiv., page 583, 1872, Dental Cosmos, Dr. M. H. Webb describes and illustrates a method of pivoting. A heavy narrow gold backing is attached to the crown, extending into the root, which is filled in with gold, extending over the margin of the root around a dovetail backing and built up to complete the contour on the plated portion.

In vol. xv., page 110, 1873, Dental Cosmos, Dr. Manuel Trujillo describes his plan of pivoting. Take an impression of the root; make die and counter-die; swage a platinum plate and trim it according to the shape of the root. Perforate the plate opposite the root-canal; make a platinum pivot and fasten through it by solder; fit a plain plate-tooth thereon and fill the palatal portion with solder. The root-canal is provided with under-cuts and the tooth fastened with bone filling.

In vol. xv., page 155, 1873, Dental Cosmos, Dr. E. L. Hunter describes this method: A pin of platinum alloy, with a thread cut on one end and a cleft on the other is screwed into the root, the cleft being intended to occupy the hole in the crown. Several of Mack's screws are attached to the base of the root; gold is filled around these and over the margin of the root, and the tooth is fitted to this surface and fastened by driving it over the cleft end of the pivot.

In vol. xv., page 289, 1873, Dental Cosmos, Dr. M. H. Webb describes gold crowns with porcelain faces. A plate-tooth with straight pins is backed with gold, the latter bent to form a cannula. A platinum-gold pivot is fitted to this, and left long enough to extend into the root. The pivot is held in the root by packing with gold, and the gold built over the margin of the root and palatal portion of the crown as well as the lateral grooves of the cannula and dovetailed cuts in the posterior surface of the porcelain face.

In vol. xv., page 503, 1873, Dental Cosmos, Dr. G. P. Carman describes the following plan. An ordinary pivot-tooth with a hole drilled clear through it is fitted to the root; a gold pivot is fastened in the root and split at the opposite end; the crown is set in position and the split end of the pivot filled with gold, thus holding the crown in place.

In vol. xv., page 657, 1873, Dental Cosmos, Dr. B. O. Doyle gives the following method. A pivot-crown is used in this process; a cylinder of heavy gold is prepared and forced into the hole, and a metallic pivot is fastened therein with shellac. The cavity in the root is filled with powdered shellac, and the tooth and pivot are then warmed and pressed into position.

In vol. xv., page 666, 1873, Dental Cosmos, Dr. T. S. Phillips, of Buffalo, describes his method of pivoting with gold pivots. A gold tube with screw-cuts upon its outer side is fastened in the root; under-cuts are made for the anchorage of gold, which is built around the tube and over the margin of the root. A gold plate is fitted to this surface; a pivot smaller than the tube is soldered to this and a plate-tooth backed and soldered to the plate. Another tube is now inserted into the former, the pivot fitting this tube accurately, and the tooth is forced into position.

In vol. xvi., page 358, 1874, Dental Cosmos, Dr. E. W. Foster, of Boston, describes and illustrates his method. Porcelain crowns similar to the ordinary wood-pivot crown are used for this process; the hole runs through the crown and is enlarged at the posterior part, forming an open cavity. These crowns are, after being fitted to the root, screwed thereon with steel screws. Gold foil is used for a packing between the root and crown. Where the end of the root is extensively decayed, it is filled with gold. This process can be applied as well on the front as on the back teeth.

In vol. xvii., page 403, 1875, Dental Cosmos, Dr. H. C. Register describes a process which differs from Dr. Richardson's rubber method only in that the pivot, instead of being vulcanized as in the former, is screwed into the body of the vulcanite or celluloid used. The attachment to the root is accomplished by filling the root with hickory and forcing the pivot with crown therein.

In vol. xvii., page 604, 1875, Dental Cosmos, Dr. T. F. Chupein, of South Carolina, communicates the following plan. The root-canal is enlarged, having a reversed cone-shaped under-cut at the lower end. A gold cylinder provided with a screw at the upper end is screwed into the root and filled around with gold. A gold plate is fitted to cover the margin of the root air-tight. The pivot is of the split type; it penetrates the plate and is soldered to it. A plain plate-tooth is backed and soldered to the plate. Before inserting, the split ends of the pivot are separated, and thus the crown is held in position by spring-power.

In vol. xviii., page 53, 1876, Dental Cosmos, Dr. Dwight M. Clapp, of Boston, gives his plan of pivoting. The root-canal is enlarged and provided with under-cuts at the lower end. The hole is filled up solid with gold, which extends over the face of the root. A hole is drilled in the center of the gold filling, for the reception of the pivot. The crown is fitted to the gold surface and attached with a wood pivot.

In vol. xviii., page 110, 1876, Dental Cosmos, Dr. J. B. Wilcox, of Michigan, proposes the following. The root is enlarged, with under-cuts; filled with amalgam, which is extended over the face of the

root; an ordinary wood-pivot tooth is attached by a hickory pivot.

In vol. xix., page 481, 1877, DENTAL COSMOS, Dr. W. G. A. Bonwill's method is described and illustrated. The root is prepared with under-cuts and enlarged greatly in excess of the size of the pivot that is to occupy it; and to prevent exposure of dentine, the margin is counter-sunk. The metal pivot used has an enlargement at one end and a screw-thread at the other. The enlarged part of the pin is retained in the root by amalgam, after the setting of which a full porcelain crown, with a hole running through and counter-sunk at both ends is fitted; the counter-sunk portion of the crown is filled with amalgam, forced into position and screwed down with a nut. Another mode is to set a three-cornered platinum pin in the root and press the crown over it, using amalgam as before. No screws or nuts are used in this latter process.

In vol. xxi., page 232, 1879, DENTAL COSMOS, Dr. H. K. Leech describes and illustrates his plan. The root is drilled out and enlarged toward the apex. A gold tube corresponding with the drill-hole is prepared; a plate is fitted to the face of the root, and the tube run through it and soldered. A plate tooth is backed and fitted to the plate. The tube is now split in two or more places; gutta-percha is laid between the root and the tooth; the latter is warmed and pressed into position. The gold tube is filled with gold—the expansion of the split end of the tube wedging it firmly into the cavity.

In vol. xxi., page 289, 1879, DENTAL COSMOS, Dr. G. W. Weld gives a method which he terms "engrafting." The root is extracted and cut squarely off at the neck. A porcelain crown with a tapering screw baked in it is screwed into the root. Root with crown is replanted.

In vol. xxi., page 322, 1879, DENTAL COSMOS, Dr. William Jarvie, Jr., tells how to attach crowns to bicuspid and molar roots. Obtain a model, drill holes in it to correspond to the nerve-canals in the roots; fit into these iridium wires; make a cap for the end of the root; solder the wires to this; back a plate-tooth; place it in position on the model, then invest and solder. The attachment is with gutta-percha.

In vol. xxiv., page 81, 1882, DENTAL COSMOS, Dr. Henry Weston describes his method. The pulp-canal is prepared with under-cuts and sufficiently enlarged to allow space for packing of gold, amalgam, or cement about the pin; the latter is of platinum and iridium, spear-shaped, and notched to give firmness to its anchorage. A specially prepared crown is used for this process, concave at its lingual or palatal portion. After fitting the crown to the root and ascertaining the position of the pin, the latter is soldered to the crown. It is fastened to the root by gold, amalgam, or cement, which is packed around the pin and built over the palatal or lingual portion to the full contour of a natural tooth.

I have for several years taken a particular interest in setting artificial crowns on natural roots. It always appeared to me that it would be an inestimable benefit to the profession to possess a method of attaching artificial crowns which would combine strength, firmness, and durability, and preserve the exposed end of the root from further decay. Great efforts, as the literature shows, have of late years been made to solve this problem, yet you will agree with me that the percentage of really successful operations by the various methods heretofore enumerated is too small to be pronounced satisfactory. There is no reason why the attachment of an artificial crown to a root cannot be made as perfect as a gold filling in an accessible cavity; but the accomplishment of this with cement or other plastic filling-material, is extremely doubtful. It has been a settled question in my mind, for a long time, that nothing could lead to success but a method which was in accordance with true mechanical principles.

IMPROVED METHOD OF ATTACHMENT OF CROWNS.

FIG. 1.

In my method of setting artificial crowns, I claim simplicity of construction, firmness, durability, and arrest of decay of the root (Fig. 1). From the following description of my method it would seem that a failure would be almost impossible. To protect the end of the root from decay and to obtain a strong hold for an artificial porcelain crown, a gold band, properly applied, must be of the greatest benefit. I am aware of the fact that gold bands have been applied, but I am convinced that their adaptation after any of the old methods is defective. What I claim in my method is the preparation of the neck of the root by a set of instruments especially constructed for that purpose. These instruments enable the operator to obtain as nearly perfect adaptation between the gold band and the root of the tooth as can possibly be made. With reference to the upper centrals, laterals, and canines, as well as the corresponding lower teeth and bicuspids, there can be nothing more favorable than the application of this method. It is true that this process cannot be applied with the same advantage to the upper bicuspids or any of the molars, but I hope in time, if I am in any way supported by the profession, to solve that problem. I believe I will succeed in constructing a set of instruments which will prepare a root, the pulp of which is alive and may if healthy be readily kept so. But as this set of instruments is not quite completed, I will abstain from its description, and only allude to the setting of crowns which require the devitalization of the pulp, unless this organ has previously died. With these instruments a circular shoulder is turned on the neck of the root.

The alteration of the neck of the root, from an irregular cone to a cylindrical form, enables us to adapt a corresponding ring or cap. Such a cap, when fitting accurately around as well as upon the end of the root prepared by these instruments, forms an air-tight joint and consequently protects it from decay, at the same time giving the porcelain crown, when attached, a firmness which heretofore has never been obtained. The set of instruments by which the neck of the root is prepared consists of drills, reamers, and trephines. The drills (Fig. 2) are used to enlarge the root-canal for the guidance of the reamer or facing instrument and trephine. The reamers (Fig. 3) cut the surface of the root down as far as necessary. They produce a perfectly level surface and have a center-pin, which corresponds with the hole made by the drill in the center of the root, and acts as a guide. The trephine (Fig. 4) has also a center-pin, and is used to make the root cylindrical below the free margin of the gum. A set of these instruments includes different sizes of drills, with reamers and trephines corresponding in size adapted to various diameters of roots.

Fig. 2.

Fig. 3.

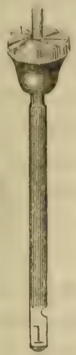
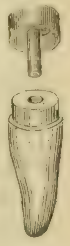


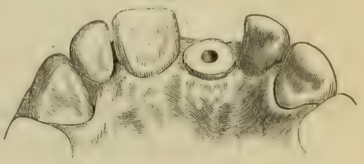
Fig 4.

Fig. 5.



The ferrules or caps (Fig. 5) to fit roots which have been prepared by the above instruments are of gold, made by steel dies. They correspond exactly with the trephine in diameter and depth with allowance for sufficient expansion of the gold when forced on to the shoulder of the root, whereby a most perfect joint between cap and root is obtained. They have a stout central pivot which fits the hole in the root and gives increased strength and firmness.

Fig. 6.



The pulp-canal is enlarged with one of the drills selected with reference to the size of the root. A reamer corresponding in size is used with the dental engine to cut the root down to a perfect level. The trephine is applied in the same manner to give a cylindrical form to it, thus completing the shoulder (Fig. 6).

A steel wire corresponding in diameter with the drill which has been employed is now introduced into the root, projecting out about half an inch. It serves to indicate the exact direction of the root-canal. An impression-cup is selected with an opening opposite the missing tooth to take an impression of the root and adjoining parts. The object of the opening is to give free transmission to the

wire in the root-canal. The wire protruding through the cup and impression-material is drawn out carefully before the removal of the impression-cup, which is then removed and the wire placed in its proper position in the impression. A set of brass root-models (Fig. 7) corresponding in size with the instruments accompany them; one of these bearing the same number as the instrument with which the root has been prepared, is now placed on the wire in the impression, and serves to represent the prepared end of the root on the model. The impression is now ready to be filled with plaster. After the cast is obtained, we find the root-model imbedded in the plaster and the wire in its center-hole. The wire is now removed and the plaster cut from around the root-model to the depth of the gold cap, which is ready to be placed upon it. A plain porcelain tooth (Fig. 8), as used in plate-work, is ground hollow on the inner surface to cover the outer front wall of the cap, thus hiding the gold. Thin platinum backing is now adapted to the tooth, which is then ready to be placed in position on the model over the gold cap, and fastened thereon with hard wax. The united parts are removed carefully from the model, invested in sand and plaster and soldered. After polishing, the cap is ready to be forced upon the root by placing a piece of wood on the cutting-edge of the tooth and driving it home with a mallet.

FIG. 7.

FIG. 8.

CLINICAL REPORTS.

PHILADELPHIA DENTAL COLLEGE—HOSPITAL OF ORAL SURGERY.

CLINIC OF PROF. JAMES E. GARRETSON, M.D.

REPORTED BY CLAUDE H. BROWNING, M.D.

NEURALGIA.—I propose discussing with you, this morning, gentlemen, the subject of neuralgia, and more especially as reference is had to its affecting the fifth pair of nerves. The word neuralgia signifies nerve-pain, and is not to be considered in any way a disease, but simply the phenomenal expression of a lesion, the discovery of which is to have the meaning of the pain. It may be very properly asked, is there not a condition, a disease, which is, or might be, termed neuralgia? It may be assumed, I think, that the sensation of pain is not normal to a healthy nerve; the complex organic substances of which nerve-tissue is composed bear a certain, definite, and harmonious relation to the force which it was designed they should transmit. If, then, we experience pain, it follows that the relative condition of nerves and nerve-force has undergone change. The altered condition, then, signifies and constitutes the irritation, of which the

pain is a result. Besides, it has frequently occurred that neuralgiæ have persistently refused to respond to treatment based purely upon an abstract idea of the condition, when the subsequent discovery and removal of a lesion has been followed by complete cessation of the phenomenon.

The diagnosis of neuralgia, then, resides in the discovery of a cause; its removal in a philosophic treatment. Causes are not always discoverable; yet we are not to infer they do not exist. The fault lies in our inability to discover them. If, then, we are unable to detect a lesion which stands in causative relation to a neuralgia, the treatment of it is, of necessity, experimental.

Neuralgia, as the word is definitely applied, refers to pains, paroxysmal in character, localized, or metastatic, and confined to the periphery, or the track of certain nerves. The pains are remittent, more commonly intermittent, and are accompanied by tenderness only when an associate lesion is found to exist, or when the irritation is so severe, or long continued, that perversion of the neighboring vascular system has resulted.

Now, let us proceed to inquire into the causes of neuralgia as affecting the fifth pair of nerves; they are predisposing and exciting. Among the predisposing causes are to be mentioned the neurotic temperament, a cold, damp atmosphere, fatigue, over-excitement, excess in drinking, poor diet, the too free use of tea, coffee, and tobacco, loss of sleep, constipation, diarrhea,—in short, anything which depresses the system or diminishes vitality.

Exciting causes are immediate, remote, and constitutional.

Of the immediate causes of tic-douloureux, are to be considered pathological conditions existing in the brain, or special nerves, and the diagnosis of neuralgia dependent upon lesions of the cerebro-spinal system necessarily implies a comprehensive knowledge of nervous disorders.

As Trousseau first pointed out, tic-douloureux is not infrequently associated with epilepsy and other coarse organic lesions of the brain, and I now recall a case in my own practice of a most aggravated neuralgia of the superior maxillary division of the trifacial nerve, which resisted every form of treatment but exsection, and in which was certainly associated the *grand mal*—in all probability standing as a causative factor. The association of epilepsy with neuralgia of the fifth nerve may occur at any age, but is more commonly met with from the middle period of life on, and in women at the climacteric period. As an immediate cause, Dr. Anstie claims the importance of certain degenerative changes occurring in advanced life, as probable factors in the production of some cases.

The same authority also believes that the essential seat of every

true neuralgia of spinal origin is in the posterior root of the spinal nerve *in which the pain is felt*, and that the essential condition of that nerve-root is atrophy, which is usually non-inflammatory in origin. I am disposed, gentlemen, to admit that neuralgiæ are occasionally dependent upon this last-named cause, but from my own experience would add, that I believe that the exceptions this cause forms to the rule are not numerous.

Neuritis is an occasional cause. Injuries to the nerve-trunk are to be considered. Caries and necrosis of the bones, exostoses, and periostitis, situated in anatomical proximity to the affected nerve, are among the local or immediate causes. The pressure of intracranial tumors and the compression exerted by aneurisms are not to be overlooked, and I now recall a case on record in which a severe neuralgia of the fifth nerve was due to the impingement of an aneurism of the basilar artery, in which case the nerve was found to be much thickened and softened.

We have now, gentlemen, to consider the group of remote causes. Of this class the lesions producing tic-douloureux are found to reside in nearly every part of the body. The most common causes, however, are found to be odontalgic, and, indeed, it would be surprising if this were not the case, when we come to consider the intimate relations which exist between the teeth and the fifth pair of nerves. Of dental conditions, caries associated with an exposed tooth-pulp is a highly prolific cause of trifacial neuralgia. A dead pulp, alveolo-dental abscess, pulp-nodules, and a variety of tumors known as the epulic rank as not infrequently causing severe neuralgiæ of the nerves which are in anatomical association with these parts. Other lesions to be considered as among the remote causes do not present so obvious a connection, and are known as reflex.

To better illustrate what is meant by the term reflex, I cannot do better than to cite a case occurring in my practice:

A lady, unmarried, thirty-five years of age, was affected by a neuralgia situated in a bicuspid of the lower jaw—the pain of nine weeks' standing, and unbearably severe. The tooth being carious and of little value was removed. No benefit followed this procedure, and a further examination of all the teeth in the mouth failed to discover any associate lesion in any of them. A search for cause extended over the system at large resulted in the discovery of an intra-uterine ulcer. The cure of this ulcer resulted in the cure of the jaw-pain. Later the same patient applied to me for treatment of an error in refraction, which was so great as to require for its correction a prescription as follows:

℞—RE+48=c+60 ax 35.
LE+32 prism 4 ax 0 c+48 ax 145.

The glasses constructed to order worked so perfectly as to elicit from the patient the remark, that she had never before seen the world as it is. Six months later the glasses ceased to work at all; the lady being returned for consultation by her physician, under the impression that she was going blind. Satisfied as to the correctness of the lenses, attention was at once directed to the uterus, ordinary sponge-tents being used for the exposure. The ulcer was back; cure of it corrected the amblyopia.

Now, gentlemen, it is obvious from the case I have just cited that lesions of which trifacial neuralgia is a reflex symptom may be innumerable, and situated in various parts of the body making their obscurity and the difficulty attending their detection great; yet only by the most diligent search after cause can you hope to be successful in discovering and removing these sources of offense.

With constitutional causes I will detain you but a few moments. The poisons of gout and rheumatism occasionally find expression in neuralgia; likewise the poison of malaria, and a diagnostic symptom of importance found in connection with this cause is the marked periodicity of the pain, and the readiness with which it yields to the exhibition of quinia. Syphilitic neuralgiæ are quite common, and easily discriminated by the history of the case, the marked nocturnal exacerbations of the pain, and the decided relief afforded by the administration of the iodide of potassium. Undoubtedly many cases are dependent upon anemia, and unquestionably many neuralgiæ are but the cry of a starving nervous system for better pabulum.

Of the treatment of this affection I have but a few words to say. The treatment in all cases is to be directed to a cause, and if possible, to its removal; if from gout, rheumatism, malaria, or syphilis, the exhibition of remedies which experience has demonstrated to be curative of these diseases; be the trouble found to reside in a carious tooth, a suitable filling may meet the indication. In a word, gentlemen, treat the offending lesion. If lesions are not discoverable or remedies fail, an operation which is directed to the resection of the offending nerve is a last but an appropriate measure.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting, held October 17, 1882, at the house of Dr. James Goodwillie.

Dr. Bronson in the chair.

Dr. N. W. Kingsley. I would like to call the attention of those present to a new dental electric engine, which I think may prove of

value to us in our profession, and would ask permission of the society for the agent, Mr. A. R. S. Foote, to describe it and exhibit its workings to us in this room.

[On motion, the request was granted, and a recess of ten minutes was taken for the purpose.]

Mr. A. R. S. Foote. This engine is made by the Electro-Dynamic Co., of Philadelphia, and may be briefly described as follows:

It consists of two semicircular electro-magnets, which together form a ring; their poles project inward, and with the wire coils form a cylindrical tube, within which a Siemens armature revolves. The poles extend laterally beyond the ring, forming supports for the brackets, which carry the bearings of the armature and the brushes of the commutator. In order to reduce the effect of the wear of the journals to a minimum, the bronze bearings are made four times the diameter of the steel shaft, and as the direction of the wear is away from the point of nearest approach, the poles of the armature and magnets can never come in contact from this cause, which was a frequent source of annoyance and danger in former motors. The friction-brushes are in pairs, and the shape of the commutator is such that one brush will always touch one-half of the commutator before its companion leaves the other.

The battery consists of six one-gallon cells, into each of which plunges a plate of zinc four inches long by two inches wide, and two plates of carbon exposing a like surface. The large amount of liquid is employed simply to save the trouble of frequently recharging. A battery containing six drachms per cell gives equal power, but for a shorter period. It is estimated that the battery once charged will continue to supply the motor with sufficient power for all ordinary use of the dentist for a number of weeks, or even months. The plates are automatically removed from the solution when not in use.

The power of the motor depends upon the amount of electricity evolved by the battery, which is easily regulated by raising or lowering the zinc and carbon plates in the exciting fluid. It has been found that when the plates are but partially plunged into the bath sufficient mechanical power is developed by the motor for all ordinary requirements of a sewing-machine, and when fully immersed the power is more than sufficient to drive a large needle through sixteen layers of cloth at a very rapid rate.

It is but fair to examine the theoretical and practical objections to electric motors used with batteries. Motors may be divided into two classes:

1. Those which utilize the attraction only of an armature to an electro-magnet.

2. Those which utilize the attraction and repulsion of two or more electro-magnets.

The former act by intermittent attraction only, and are wasteful of electric energy, because the residual magnetism during interruption of the current retards the movement of the armature away from the pole which has just attracted it. Those of the latter type, however, convert a portion of the retarding influence of the residual magnetism into a useful force.

In fact, all dynamo-electric generators, when used as motors, convert all magnetic resistance to motion into a counter electro-motive force. At first glance it seems strange to consider a counter-force as an economy, but, in point of fact, the action of this force retards the consumption of zinc in the battery and tends to depolarize the negative plate. It has been usual to regard the counter electro-motive force as increased resistance, but a simple experiment will show the error of this view, and will at the same time amply demonstrate that economical motors must also be efficient dynamo-electric machines in order to recover this force, which would otherwise be lost.

The little motor exhibited this evening is an efficient dynamo-electric machine. The most essential advantage which it possesses over the older forms is in the field-magnets. Their peculiar shape is such that all the magnetic lines of force, including those nearest the neutral line, are brought into the best possible position for effecting the revolution of the magnetic armature. I believe that the distinguished inventor, Mr. Ladd, of England, claims to have discovered the great advantage possessed by the lines of force of a nearly circular magnet over those of the usual horse-shoe form, but he does not appear to have attempted to utilize the lines of force which fill the interior of a curved magnet from the neutral to the polar points.

If a bar of soft iron is pivoted at one end so as to move in a horizontal plane, and a semicircular magnet is placed concentrically with the circle which the bar can describe, it is found that a given force is exerted upon the bar at a much greater distance from the poles when the latter is within the semicircle than when it is without. I believe that no field-magnets of this principle have ever before been made, and herein is the secret of the power of this little motor, which weighs about two and a half pounds, and which compares favorably in respect to its power with those of the old forms of fifteen times its weight.

The great bugbear of those who have used electric motors has been the battery. It gave forth offensive and poisonous vapors, it required almost continual attention, it used concentrated acids, and

it became rapidly exhausted whether it was used or not; it was the frequent cause of accidents to clothing, its cells were readily broken, and the connections were constantly eaten away. All these objections are now done away with. The present battery is inclosed in a strong water-proof box, does not use concentrated acids, gives out no odor, does not exhaust itself, requires renewing only after the fluid is used up by actual work, will last for months or years, if left to itself, and be in as good order as at the beginning. It is ready without a moment's warning at all times and seasons, and it is exhausted always in proportion to the amount of work done. This form of battery places the speed of the motor completely under the control of the operator.

Now, man-power, according to the tables of a well-known English engineer, is one hundred times as costly as steam; nevertheless there are several circumstances in which we prefer men. It is certain that we should never employ men if we could get a steam-engine to do the work more cheaply, and it is equally certain that we should not use electricity where steam was applicable. But steam is *not* applicable to work in which we require a small amount of power in constant readiness for action. In these cases, such as jeweler's lathes, dental engines, and the various tools of small machine-shops which employ but a small force of men, we have never been able to find a source of power adapted to the work, which, though not so cheap in proportion as large steam engines, should yet be more economical than human energy. The fact is that the best electric motors are nine times as costly as steam-power, while *human* energy is eleven times as costly as electricity. Inasmuch as human energy, which is one hundred times as costly as steam, is frequently preferred to steam engines; *a fortiori*, electricity, which is only nine times as costly, will often be preferred to steam; and it will require no argument to show that a large amount of human energy thus saved from exhaustion in the exercise of brute force can be devoted to higher uses.

The motor is so balanced and suspended from a wheel which rolls on a swinging rail, that it can be made to assume any position without effort on the part of the operator.

[The exhibitor then showed the engine in operation. There was very little noise produced, and the power developed seemed abundant for the purpose required. It was found impossible to stop the rotation of a one-eighth inch bur with any less side pressure than would break it. The speed of the motor was said to be eleven thousand four hundred revolutions per minute with the single battery, and to exceed fifteen thousand with the double battery; this, however, was under the control of the operator, who regulated it

by a slight pressure of the foot on a knob behind the chair, which connected with the battery].

Dr. Kingsley. The subject of labor-saving machinery is one of the most important which can engage our attention. We have all of us derived so much benefit from the ingenious inventions of the last few years, that we may hail with satisfaction any apparatus which promises to give us still further relief from our severe physical labors. The motor exhibited to us promises to do all the work of the dental engine in common use, and without any physical strain in its management. I have one now in my office, and may desire to give the society a report of my experience with it at some future time. I think the society is so much indebted to Mr. Foote, that I move a vote of thanks be given him for this exhibition and his description of the instrument. Carried.

Dr. A. H. Brockway. I look with great interest upon every appliance which promises to lighten the labor or to increase the efficiency of the dentist, and I have long felt that some motive-power other than the foot of the operator was necessary to fully develop the utility of the burring engine, helpful as it has already proved. Nor is my opinion merely a theoretical one; for several years I delegated the duty of working the treadle of my engine to my assistant at the chair, with very manifest advantage; improving upon that, I made use of an electro-magnetic motor for the purpose, but this proving objectionable on account of its noise, I substituted for it a Backus water-motor, which I have now had in use nearly two years, and which works quite to my satisfaction. Of course, water-power cannot be had in all places, and its use is attended with considerably more expense than would be the case with such a motor as is now before us, so that this will, doubtless, prove more generally useful to our profession, if it will do all that is claimed for it. I most earnestly hope that it may, for I am sure, from my own experience, that the employment of some such motive-power for the purposes indicated, would greatly increase our usefulness and in no small degree lessen the fatigue of our labors.

Dr. Jas. E. Dexter. Objection has been made to the small size of the motor now before us as indicating a want of power, and comparison has been made with the Bastet motor. I would point out the fact that the Bastet, in common with all motors not using a Siemens armature, had to expend so much power in running itself that it was required to be very large in order to afford sufficient surplus power to accomplish any other work. The loss of power in that and other motors of its class lay principally in the secondary current set up in the magnet at the moment when the revolving armature was passing and leaving it and breaking the circuit. This

secondary current, though not so strong as the exciting battery-current, was sufficiently so to require a large portion of the power exerted by the *next* working magnet to overcome its detaining power over the revolving armature through the *first* one. Added to this, the residuary magnetism (always left in any electro-magnet for a greater or less time after the cessation of the exciting current) was another obstacle against the rotation of the armature to be overcome by the next working magnet. Thus, the Bastet and other similar motors (similar in principle) expended so much power in *running itself*, that little surplus was left for other purposes. Hence a weak motor, which must be large to be practical.

In the motor before us, however, the armature is a magnet as well as the magnet itself, and the currents induced in each by the breaking of the circuit in the magnet are such that the magnet and armature, after passing centers, *repel* instead of *attracting* each other; thus giving a great *gain* in power in the very place where the older and larger motors sustained their greatest *loss*. Therefore we have a small motor with much more available working power than the older and larger ones.

The battery shown us also claims attention. It is a single-fluid battery, substantially the well-known "Grenet" battery, the zinc and carbon elements being simply suspended in a jar of what is technically known as "electropoion fluid" (generally a mixture of a watery solution of potassium bichromate with sulphuric or other acids). A simple strong solution of the potassium salt will answer where there are so many cups as here. The manager informs me that the fluid used in this battery contains no acids. I should say, then, that the battery will be perfectly harmless to steel instruments, etc., in the operating-room, and the more so, since the zincs are exposed to electrolysis *only* while the motor is in action.

Dr. John B. Rich. It will be remembered that I reported at the May meeting of the society a very singular case of the consecutive death, without obvious cause, of the pulps in several teeth in the mouth of a young girl. I expressed the opinion at that time that the pulps in the remaining superior incisors would share the same fate at no distant day. I have to state now that this has already been the case, the pulps in the two lateral incisors having recently died.

A paper on an improved "Attachment of Artificial Crowns to Natural Roots,*" was then read by Dr. H. W. F. Büttner, of New York. The method presented was warmly commended, and a vote of thanks was passed to the essayist.

Adjourned.

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* This paper will be found at page 12, current number of the Dental Cosmos.

AMERICAN DENTAL ASSOCIATION—TWENTY-SECOND ANNUAL SESSION.

FOURTH DAY.—*Afternoon Session.*

THE newly-elected president, Dr. W. H. Goddard, of Louisville, was installed.

Section III., Dental Literature and Nomenclature, was again called, and Dr. Taft read a report, of which the following is an abstract:

The history of the development, growth, and progress of dentistry and the dental profession as given in its literature is, in the main, familiar to all readers and students.

When any particular subject is brought forward for consideration, the first inquiry usually is, what has been written upon the subject, from whom has it emanated, and how has it been presented; and this interest extends not only to what has reference to special and immediate branches of our science, but to those which are collateral as well.

Some things which are usually denominated collateral, really constitute the foundation of our science, and the manner in which these are presented is a matter of much importance to us. Indeed, the literature of any branch of study that can be made tributary to our science is of great importance and interest.

Formerly the study of the pupil and of the practitioner was confined to the so-called *dental* books; but a great change has been wrought within the last thirty years, chiefly through the instrumentality of dental colleges. Now, the subjects to which the student is required first to give attention are anatomy, physiology, materia medica, and chemistry. And these studies are placed first by private instructors as well as colleges.

It would add much to the strength, progress, and prestige of our profession could its members keep abreast with the general sciences. It may not be practicable nor even possible for him who is burdened with the duties of a large practice to be perfectly familiar with all the scientific topics of the day, but as these subjects are now treated, one may, by careful selection, gain a general and even accurate knowledge much more easily than in former times even under the most favorable circumstances.

The general literature of the day, perhaps more than ever before, presents thoughts, ideas, descriptions, and facts in a brief, compact form, rather than in the prolix, verbose and argumentative way of many of the earlier writers—on scientific subjects especially.

This is preeminently an age of paragraphing, a time when men scan books, rather than read them, for ideas and facts. Any subject, to receive attention at the present time, must be presented in an

attractive style, full of strong points and pungent effects, and above all condensed to suit the taste of a people who are living at a rate wholly unknown to our forefathers.

The aim now is, not to invest thoughts or ideas with as many, but with as few words as possible, and hence the growing importance of giving to every word a clear, definite, and as nearly as may be, a fixed signification.

Many of the works written in former years for our profession have for the most part attempted to cover too much ground, as for illustration, the works of Fitch, Harris, and Tomes; in which the subjects of anatomy, physiology, pathology, operative and prosthetic dentistry are all presented in one volume. This seemed to be, and no doubt was, at the time these books were written, a necessity, yet from our present stand-point it would have been better to have devoted a separate volume to each distinct subject and thus given them greater importance and made them, each, to stand out in bolder relief. Each subject could have been treated in a fuller and more satisfactory manner, and an increased number of volumes would have been added to our catalogue. One of the great needs of our profession is carefully-prepared text-books on dental science for students, for many of our best text-books do not meet the requirements of the pupil. Prepared with special reference to his wants, the subjects should be systematized and graded so that the work of the student in this, his special education, as in any other, should be easily and regularly progressive, or ascending. There is in our literature very little that is in proper form for the student,—in the first year of his course, at least. Care should be exercised in the selection of text-books, and reference-books as well, for accuracy and clearness of statement are qualities of the first importance. Works of a controversial character are to be avoided, especially by the beginner, as they so often confuse rather than bring out the truth fully and clearly.

Books of reference for the advanced student and the practitioner should, in their turn, be free from all matter of a merely elementary character. There is therefore room, and I may say a demand for two or three distinct classes of treatise upon each branch or subject of dental science and art.

Books of an elementary nature are much needed, in addition to those we have, upon all branches of dental study and a wide field is open in this direction for the earnest, honest, and capable writers of our profession. But let no man write a book merely from a desire to become an author.

The *periodical* literature of our profession is assuming annually more and more importance, and it is, to some extent at least, trench-

journals, varying in size from thirty-two to sixty pages each, and four or five issued regularly in newspaper form; the latter are chiefly devoted to advertisements for manufacturers and dealers. These ten journals contain each month about 425 pages of matter, four-fifths of which is original, and a large proportion of this is of interest and real value to the profession and of permanent worth, and much of only temporary interest. There is enough in each journal of real value to make every dentist who determines to be in the front rank willing to take the whole.

The ten dental journals of the United States contain each month 425 pages, or 5100 per year. The British journals contain 1692 pages per year, the German, 1984, the Italian and Spanish, 164, the French, 948, making in all 4824 pages. According to this estimate the periodical literature of the United States exceeds that of all other countries by 276 pages.

There have been published in this country about sixty volumes of Transactions of dental societies, varying in size from fifty to three hundred pages each. This body has published annually from its organization to the present time, a volume of its Transactions, and consequently has twenty-one volumes.

Discussion.

Professor Mayr. Dental Journals as published at present to a large extent use the same words with a variety of meanings, so that it is many times very difficult for a careful reader to make different essays agree with each other. It seems to me that the subject of dental literature is closely connected with that of the reform of technical terms. Such terms should always have the same signification. Authors should be very careful to state what they mean by words used commonly in so many different senses. When I was so unfortunate as to be dragged into the business of editing a dental journal, I thought it would be necessary to give as an introduction to our journal a list of technical words, with the exact explanation of what we meant by them. I wish I had! Every one of you must have realized the difficulty of understanding the exact meaning of many essays. There are several dental journals published in Spain that are nothing but the English journals in the Spanish language, and the same may be said of the Italian journals. They are a reproduction of American and English journals, so that America has there a scientific influence on the Continent, which she does not have in any other branch of science.

There was another point that I had marked out as of importance, and that was with reference to text-books. Has any one of you read that little book published under the banner of Professor Flagg,

of Philadelphia? I do not know if he wrote it, and I doubt if he did. There is nothing as funny in its line as that. It is said that good humor promotes digestion, and I recommend every one of you to read that book after dinner, if you are troubled with dyspepsia. In that book there are hardly a dozen scientific words that have a clear meaning. They are nothing but words, words, and empty words: a conglomeration of letters that may as well be divided anywhere else, as where they are. I hope that such books may not be adopted in our colleges.

Another point is with reference to standard books on chemistry. I think it belongs to the subject of literature, to inquire whether there exists a special chemistry for dentists, and if there exists any such book, I would warn teachers *not* to use it, because, if at the very commencement of a course you narrow the student's mind by making him believe that there is a special chemistry for dentists, another one for doctors, etc., he will learn no chemistry at all.

I have recently read the book on dental surgery and pathology, by Coleman, which is a very good work, except that the author, as it seemed to me, has neglected to notice properly the progress, in some departments, of the last ten years. Dr. Carl Heitzmann's name is mentioned rather incidentally only. The chapters added to the American edition have been thought by some to be only an advertisement of a certain firm, but I see much in them that is excellent. They are practical and give information as to where certain tools and instruments can be obtained. I consider the book valuable for students who wish to acquaint themselves, without much trouble, with the topics treated in the book.

The subject was passed.

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

A regular meeting of the First District Dental Society, State of New York, was held June 5, 1882, at 8 P.M.

Dr. A. L. Northrop, president, in the chair.

Dr. Reese presented a case of his artificial crown setting. He stated that he had sought for some way of setting artificial crowns upon roots which were too badly broken or too deeply decayed to admit of success by the ordinary methods in use; and had found it in the manner he now exhibited. The case showed a lower molar, the crown almost wholly gone, and the jagged stump remaining, in parts below, and in others above the gum line. To have leveled off these projections would have weakened the roots considerably, besides lessening the hold of any ordinary crown-setting. He carefully cut away

the softened dentine, and cleaned the roots; after which he roughly fitted a Bonwill crown, and waxed into each of its apertures a pin of platinum and iridium alloy to project into the roots. Softened wax was now placed in the roots, and the crown and pins held in position long enough to allow the patient, by closing the jaws, to determine the proper occlusion and length of crown. The wax was next chilled by syringing with cold water, and the crown, wax, and pins all carefully withdrawn together. He then invested the pins and the lower portion of the wax in plaster in one-half his flask and the crown in the other half, separated and washed out the wax, and replaced it by Reese's metal. The whole, upon now being put in place in the mouth, fitted perfectly, the metallic base following accurately all the irregularities of the jagged stump. The crown was left in position, without being permanently fastened, until all soreness had disappeared. Permanent fastening could be secured by undercutting and any of the cements. He simply applied gutta-percha to the pins and the under surface, dried and warmed the roots, softened the gutta-percha, and pressed the whole to its place.

Dr. M. L. Rhein thought it would have been better to have applied the rubber dam, cut away all frail edges, and built a filling on the stump.

Dr. J. E. Dexter was of opinion that the case exhibited by Dr. Reese was one of excellent adaptation to the circumstances and the end in view. It was often very difficult to fit and fasten any artificial appliance to little half-hidden pegs of roots, such as we often see. Dr. Reese had preserved all the strength left in the roots presented in his case, and had secured a very accurate adaptation of the artificial crown to its seat. A further, and very important advantage secured by this method, was the possibility of rendering the roots perfectly healthy before permanently fastening the crown in its place.

The question for the evening, "Saving *vs.* Destroying Pulps," was then introduced.

Dr. Frank Abbott. I never surrender a point in saving a pulp when I can possibly avoid it. I think it is done much too often to comport properly with the dentist's duty to himself and to his patient. There are certain conditions connected with the destruction of a tooth which seem not always to be taken into account. The simple removal of a certain amount of tissue from a tooth, taken by itself, seems nearly harmless; although the wound at the severed apical end of the pulp may induce trouble, through inflaming. Such inflammation results always in the return of that wounded portion to medullary or embryonal tissue, and eventually cicatricial tissue is formed here. If this, from its low order of organization, should take

on abnormal action from some exasperating cause, and supposing the tooth to be merely a mineral crystallization, we would then have a simple lesion to treat. But the tooth is not merely a mineral crystallization. Nearly one-third of its substance is living organic matter, connected directly with, and nourished by the pulp we have removed. The pulp dead, the organic matter of the dentine and enamel must die also; for it has very little connection with life save through the pulp. What follows death? Decomposition. The organic portion of the tooth decomposes, putrefies, and gives off septic gases, which find their way through the apex of the root and poison the surrounding tissues. Further than this, there is a perfect connection between the living-matter of the dentine and that of the cementum, which latter is nourished by the pericementum. Hence, when the dentinal living-matter has died and is decaying, it must poison that of the cementum; and, through the latter, the pericementum is affected. If pericementitis is not soon set up, there will be, at least, hypertrophy of the membrane, or pericemental irritation; either placing the long retention of the dead tooth in doubt. A dead tooth must be constantly nursed. It is always in danger, and must be always surrounded with extra precautions. The patient takes a slight cold, and at once the tooth "growls," and is projected from its socket by the thickening of the pericemental membrane. Then comes, unless precautions are taken, pericementitis, either acute or chronic, and the dead tooth is then better out than in the mouth; for its presence will do more harm through irritation than it can possibly do good in mastication or appearance.

I have been questioned as to the action of arsenious acid upon a pulp. The irritative action of this poison progresses along the line of the living-matter contained in the dentinal canaliculi, and that between the odontoblasts, to that of the pulp proper. The distance to which this irritation may extend is limited by the duration of the arsenical power to maintain like action at its point of contact with the pulp. If the amount of arsenic is small, the poisonous action will be also comparatively slight. Witzel, according to his doctrines lately promulgated before this society and the Odontological, applies arsenic to a slight pulp-exposure, and afterward amputates the pulp. What has he done? He has simply converted a small exposure into a large one. I have showed you how pulp-inflammation inevitably results in a return of the inflamed part to its medullary condition. Now, the *stumps*, after Witzel's operation, go through the same process; for a wound inflames, and the medullary condition supervenes, as surely in one case as in the other. Therefore, all Witzel has done is, to convert a slight inflammation and disorganization into a considerable like condition. It seems to me more advisable to treat the small

lesion in preference to the great one. Should a portion of a pulp be found dead, of course we should remove that portion, and endeavor to save the remainder. But I cannot see the necessity for deliberately destroying the half of a living pulp in order to create stumps to treat. I have shown the effects of a retention of dead pulp-substance in a tooth; and the inference is simple that such evils will be avoided by a retention of the pulp in a living condition, and that, just in proportion as we remove living pulp-tissue, will the chances for occurrence of those evils be increased. Because, remember, the pulp, alive, preserves life in the dentine; but, if the pulp, or any part of it, be removed, that portion of dentinal bioplasson dies also.

A Question. Will Dr. Abbott explain his method of treating and capping an exposed pulp?

Dr. Abbott. There are several conditions which call for these operations, some of which are, for instance: cases of exposure in the chair during an operation, where the pulp has never ached; cases where exposure through decay has been followed by hours or days of pain; cases of exposure followed by fungous growth of the pulp. In cases of the first kind, I cap at once. I carefully and thoroughly clean the cavity, avoiding touching the pulp, and producing as little irritation as possible. I then touch the exposure with creasote on a pellet of cotton, allowing this to remain in place until I have prepared my capping. I then remove the cotton, dry out the cavity, place a little oxide of zinc on the exposure, cover the whole with a cap of Dawson's cement (an oxyphosphate of zinc). Over this I place gutta-percha sufficient to prevent thermal changes, and then fill with whatever filling I deem proper for the case. In cases of the second kind, I put cotton and creasote upon the exposure, and cover it temporarily (until all irritation has subsided) with a preparation of gutta-percha and wax (equal parts of pink pattern gutta-percha and pure beeswax, melted together); afterward I proceed as before. In a case of fungous growth, I cut out the fungus, treat the exposure with creasote, and again proceed as before. In cases of ulceration, I cut away all disorganized tissue until I arrive at the healthy point, and then cap as already described. In cases of exposure in children's teeth, I have had no success with oxyphosphate as a capping. Here I apply a pellet of creasote-saturated cotton, place upon this a platinum cap or cover, and fill with amalgam or any suitable material.

Dr. W. T. LaRoche. I think hardly anything can equal gutta-percha as a capping for pulps. It is extremely plastic, and the best of the non-conductors. I place creasote on the exposed pulp, and then carefully dry the cavity, leaving a film of creasote on the pulp only. Then I apply warmed gutta-percha, tacking it (by its sticki-

ness) to the dentine beside the exposure, and carrying or stretching it across the pulp to the dentine on the other sides, being careful not to press upon the pulp. Upon teeth so treated I have often built gold at once, even after the pulp had been bleeding. I have such cases, so treated and built upon years ago, which are in excellent condition to-day.

Dr. J. E. Dexter. I would like to hear a description of the action of creasote upon pulp-tissue. Why is it that this material is such a pulp-saver? creasote is a powerful escharotic. According to the latest teachings in pathology, any lesion of tissue will inevitably result in a return of the part to its medullary condition. Now, let us take a case of fresh exposure of a pulp which has never ached. The surface presented to us has no break in its continuity. No inflammation, or even congestion, is apparent. Nothing has touched that surface except air,—which, it is true, carries a septic influence to wounds, but here is no wound. To such surfaces, and under such circumstances, we constantly apply a powerful escharotic agent, whose antiseptic influence, according to recent discoveries, appears to be much less than has been generally supposed. Such treatment we all practice, and with success. The escharotic action, of course, reduces the hitherto undisturbed pulp-tissue to its medullary condition. Besides that, the albumen contained in the exposed portion is at once coagulated by the creasote, to such a depth as will stop all further action of the drug. This changed pulp-tissue, and this coagulated albumen, are subject to putrefactive change. Yet such change does not, ordinarily, occur. And, further, the creasote cannot exhibit direct action upon the pulp after its first application, through an impermeable coating being formed over the exposure by coagulated albumen. I am not arraigning the treatment at all. On the contrary, I habitually practice it myself (with some modifications), and hold pure creasote to be the most efficient pulp-saver in the dental materia medica. But I should like to hear a scientific, theoretical exposition of its action in these cases.

Dr. Abbott. First, the septic influence of the air is aborted by the antiseptic influence of the creasote. Next, the coagulated albumen on the exposed surface forms a close cap, impermeable to the air and kept under antiseptic influence until the creasote is absorbed or in some way removed. Finally, the pulp forms cicatricial tissue next to the coagulated cap of albumen.

Dr. M. L. Rhein. I think creasote will save pulps, provided the previous inflammation has not been such as to cause the death of the remainder of the pulp after capping. But I am of opinion that there are many dead pulps under caps in cases supposed by the operators to be successful. I dislike filling roots with oxychloride or

oxyphosphate, and think gutta-percha, warmed or in chloroform solution, the better material for root-fillings.

Dr. LaRoche. I would like to describe my method of filling roots. I remove the whole of the pulp, and fill the root with cotton and carbolic acid, allowing it to remain for a day or two. I then remove this dressing, and, filling the cavity with dry cotton previously saturated with carbolic acid and oxychloride of zinc, leave the case until all soreness has disappeared. When ready to fill, I mix carbolic acid and oxychloride of zinc with cotton, and introduce a pellet of this to the apex of the root, filling the remainder of the root with gutta-percha. This treatment has been the most successful I have ever pursued. Should there be ulceration or periosteal disease, I believe it cannot be permanently cured except by drilling through the process and treating from the outside.

Dr. O. A. Jarvie. I would like to say to the young men, save every exposed pulp that you can save, no matter at what cost of time and trouble to yourselves. But sometimes pulps give trouble before exposure; and then the treatment is not so easy to determine. Could we look through the dentinal walls, and see the lesion occurring inside, we would be aided in forming our course of treatment; but, unfortunately, we cannot do so. Then the question arises, "Shall I go in there, or shall I not?" In cases of freshly-exposed, undiseased pulps, I follow the practice described by Dr. Abbott. But, even then, I cannot feel justified in stating confidently that my tooth, so treated, is permanently cured. I hold that once the delicate tissues of the pulp have been, in any way, disturbed, no one can certainly predict the consequences of any course of treatment for any great length of time. No treatment will insure the permanent vitality of a once-exposed pulp. As to capping with gutta-percha, I cannot indorse the practice, since this material is destructible in the fluids of the pulp-cavity as well as in those of the mouth. It will absorb moisture, swell, and cause pressure on the pulp. Capping with metallic plates is even worse, especially if of gold. All spaces cannot be closed with rigid metal.

The society then adjourned.

James E. Dexter, *Secretary.*

Notice.—At the monthly clinic of the society, Dr. Frank Abbott delivered a clinical lecture on Dental Anatomy and Physiology. This will be published as soon as made ready for the press by Dr. Abbott.

DENTAL DEPARTMENT OF THE UNIVERSITY OF CALIFORNIA.

The Dental Department of the University of California held its first commencement exercises at B'nar' Brith Hall, San Francisco, on Wednesday evening, November 8, 1882.

Unlike the Eastern colleges, the Medical and Dental Departments of the University of California hold their services in summer instead of in winter.

An address on behalf of the State was delivered by Governor George C. Perkins, and also one on behalf of the Board of Regents by Rev. Horatio Stebbins, A.M., D.D.

The valedictory on behalf of the Faculty was delivered by the Dean, Prof. S. W. Dennis, M.D., D.D.S., and that on behalf of the graduating class by Henry John Plomteaux.

The number of matriculates for the session was thirty-two. The degree of D.D.S. was conferred on the following members of the graduating class by W. T. Reid, A.M., President of the University:

Thomas Watson Hall	California.	Charles Wesley Richards	California.
Charles Wesley Hibbard	California.	William Harry Stanley	California.
Thomas Morffew	California.	Gustav William Sichel, M.D.	California.
Henry John Plomteaux	California.	August Van Crombrugghe	California.

EDITORIAL.

CIRCULAR LETTER TO STATE BOARDS OF EXAMINERS.

During the late meeting of the American Dental Association the desirability of a uniform standard of requirements was discussed in the report of the Section on Education, and a resolution recommending to the various dental colleges "the organization of an association of colleges for the purpose of securing concerted action as to what shall be required of students, both upon entering and leaving those institutions; and that in case such an association is formed, no college refusing to abide by the action of the College Association shall be recognized by the American Dental Association," was offered and referred for action next year. The circular letter which appears below refers to another movement in the same direction. The subject is one of great importance to practitioners of dentistry, and the invitation should receive the attention which its importance demands from those interested.

Lexington, Ky., Dec. 6, 1882.

To the President and Members of the State Board of Dental Examiners of———

Gentlemen:—At the late meeting of the American Dental Association, held at Cincinnati, in August last, there were present at least twelve members of State examining boards, representing five different States. An individual interchange of experience and opinion relative to methods of examinations, possible uniform standard of qualifications and other matters of import, revealed the fact that under the present state of things, it could scarcely be hoped to apply the law with anything like uniformity in the different States, on account of imperfect knowledge of

many important points connected with the same, and its enforcement. In order to bring the matter into more definite shape, a regularly-organized meeting was held, at which every member of an examining board in the city was present. Here the objects of the meeting were more fully discussed, and in furtherance of the views of those present, the undersigned were appointed a special committee. The duty of this committee is to communicate and consult with the different State boards of dental examiners, to discuss all matters of importance relative thereto, and arrange for a meeting at a central point for representatives from every State which has an examining board.

The necessity for such meeting is certainly not within the pale of doubt, since the objects to be attained are of both special and general interest, and shared in common by our colleges, the profession, and the community at large. To state these objects briefly it is desirous that we secure unity of effort and systematic action relative to all questions touching the manner and standard of examinations, the uniformity of the laws' action in the several States in which dental laws exist, the relative duties of our profession, boards of examiners, and dental colleges, and the permanent organization of a society to consist only of members of State boards of examiners. Among the many questions which have already arisen and which will, in the near future, come up more frequently and persistently, is that of receiving the certificates of qualification of other State boards in lieu of a re-examination. Some State laws are silent on the subject, while the laws of Illinois positively prohibit it. In behalf of those to whom is intrusted the execution of the law, in behalf of the dignity of the law, and for the sake of those amenable to the same and seeking its protection, this latter question should be hastily and definitely settled. The more fully these matters were discussed, the more it became evident that a full meeting of representatives of the different State boards ought to be had, so that all matters of importance might be discussed and proper conclusions arrived at.

In pursuance of the wishes of this Cincinnati meeting, the Committee would earnestly request your board to send its duly-authorized representative to a meeting to be held in the city of Lexington, on the 20th day of February, 1883, beginning at 2½ o'clock, and continuing one or more days as necessity may demand. Headquarters, Phœnix Hotel.

A. O. RAWLS, Kentucky,
F. H. REHWINKEL, Ohio, } Committee.
A. W. HARLAN, Illinois,

OBITUARY.

DR. WILLIAM H. ALLEN.

At a meeting of the First District Dental Society of the State of New York, held November 7, 1882, a committee, consisting of Drs. F. M. Odell, W. H. Atkinson, and W. T. La Roche, was appointed to draft suitable resolutions in relation to the death of Dr. William H. Allen, and to prepare a memorial page for the records of the society. The committee subsequently reported appropriate resolutions and a historic and eulogistic record of the deceased. These were unanimously adopted.

DR. FREDERICK CROCKER.

DIED, at Sag Harbor, N. Y., November 19, 1882, of paralysis, Dr. Frederick Crocker, aged seventy-six years and six months.

The subject of this notice was educated for the profession of dentistry in London, Eng., and in early life came to this country. He resided a short time in New London, Conn., and about 1836 settled in Sag Harbor, where he continued his practice until 1857. Through his wife, who has been many years deceased, he became possessed of a competency whereby he was enabled to live in ease and affluence. Being by nature benevolent and sympathizing, he contributed to many charities, both public and private, and through his kindness of heart and social qualities he made many friends.

DR. AMOS JOHNSON.

DIED, in New York City, December 10, 1882, Dr. Amos Johnson, in the seventy-ninth year of his age.

Dr. Johnson was a native of the State of New York. He was probably the oldest practitioner of dentistry in New York City at the time of his decease. He was successful in the practice of both dentistry and medicine. He was widely known as an honorable and warm-hearted gentleman, of rare simplicity of character, and leaves the memory of a consistent and exemplary life, which had been one of activity and usefulness. His funeral was attended by many members of the medical and dental professions.

PUBLISHER'S NOTICE.

THE DENTAL COSMOS FOR 1883.

WITH this number the DENTAL COSMOS enters upon its Twenty-fifth volume.

Succeeding numbers will be published on the first of each month following.

Twenty-four years of uninterrupted monthly publication and a steady increase in circulation and influence justify the belief that the efforts of publisher and editor have met the approval of our patrons. We have aimed to stimulate study, to quicken the spirit of research, and to supply the wants of every ambitious practitioner; have sought to furnish information of all improved modes of practice which the best heads and hands in the profession have developed; have endeavored to gather all that general medicine, surgery, and their associate sciences have afforded of special significance in the theory or practice of dentistry. We have certainly

adhered persistently to the original aim as expressed in the title of the journal—to make it first and always a *dental* periodical. No contribution has been accepted, no selection made, which did not promise to be of value to the dentist, as such; and, as to the future, it is our intention to adhere to this idea.

The DENTAL COSMOS will continue to be a DENTAL journal—*the* dental journal of the world, if our experience, efforts, and means will enable us to make it so. We are assured that each of the twenty-four volumes has been worth more than the subscription price, and certainly every consideration will stimulate effort not only to maintain but to advance its standard of excellence.

Nearly all the subscriptions terminated with the issue for December. *Those who have not yet renewed will find a prepared blank for the purpose preceding the advertising pages of this number.* Relying on the use of this blank, we have not sent bills as heretofore. The January number will be sent to all subscribers to the last volume, but no subsequent number, except to those authorizing its continuance. Prompt renewals and subscriptions are earnestly desired and solicited.

THE S. S. WHITE DENTAL MANUFACTURING CO.

PERISCOPE.

SALIVARY FISTULA—A NEW OPERATION—CURE.—Dr. J. L. Krouse reported a case of salivary fistula, stating that it was of interest on account of the operation employed being different from that usually mentioned in text-books, and on account of its favorable result.

The patient, a girl of five years, four months ago injured herself by falling upon a sharp piece of wood, which entered her cheek. The greater part of the foreign body was removed at the time of injury; but subsequently several smaller pieces came away. The wound discharged all the time, and not seeming to get any better, the mother brought the patient to the clinic of the Medical College of Ohio. Here the speaker saw the patient for the first time. She presented, on the left cheek, midway between the angle of the mouth and the concha of the ear, a linear cicatrix, vertical in direction, of 1½ inches in length. At the upper border of the same, there was a large vesicle filled with turbid fluid. This, the mother said, would burst every now and then, discharging the watery contents over the cheek. As long as there was a free outlet to the secretions, the patient complained of no disagreeable symptom; but when the opening closed, then pain as well as swelling of the parotid region supervened.

On August 4, that is, three months after the receipt of injury, he operated by passing a silver wire armed with two straight needles through the external opening into the buccal cavity. The free ends of the wire were then twisted in the mouth and the external wound closed.

The object of the wire was to maintain an opening between the injured duct and the buccal cavity; it was allowed to remain there until the external wound had closed.

On September 5, thirty-two days after the operation, the wire was removed. The recovery was perfect. The last time that the patient was seen was on October 24, seven weeks after removal of the wire. At that time the wound was still closed.

Dr. P. S. Connor remarked that in view of the fact that salivary fistulæ are very troublesome, especially when there is great loss of substance, the reporter of this case could be congratulated on his favorable result. He preferred this operation to the usual method of making an opening inside the buccal cavity or punching out an opening.

Dr. Osmond said the case was similar to one he had some years ago. The original cause in this instance was a decayed tooth, and the discharge was copious. He operated by puncturing a hole into the mouth and inserting a small, hard-rubber tube, with a slight flange put in from the outside, and fitting another one on that from the inside. Afterwards he closed the external wound with stitches and applied collodion over it. The rubber tube remained in place one month, after which the patient was cured.

Dr. Ransohoff had no personal experience with salivary fistula, but from the fact that it often required several operations before it proved successful he also considered the result obtained by the reporter of the case under discussion very satisfactory. The principle of all operations is the same,—to establish an opening into the mouth that must remain patent. Usually it is punched with a trocar, and a tube of lead may then be inserted.

Dr. Zenner said he could testify to the success of the operation, as he had seen the case both before and after it was operated upon. He remembered reading an article some time ago in the *Progrés Medical*, where a Paris surgeon suggested an elastic ligature for that purpose.

Dr. Young remarked that some of the speakers had mentioned the difficulty of keeping the duct open, and that it was therefore necessary to punch out a hole. He remembered a case where a man had had a fistulous opening for a long time. A surgeon passed in a bistoury and united the external wound with a couple of sutures. The speaker pursued the same method in one instance and found it sufficient. All that is necessary is a simple opening. The external wound will unite and the internal is kept open by the flow of the saliva. Neither in this nor the case of the other surgeon was there any return of the difficulty.—*Reports of Cases, Academy of Medicine, Cincinnati Lancet and Clinic.*

Case of Cancrum Oris in the Adult.—R. C., aged 47, coachman, of intemperate habits, was admitted into the Hertford British Hospital, Paris, on June 28, suffering from a sore heel, with pain and swelling in the left foot and leg. A week before admission, his heel was kicked by a horse. This injury caused a bruise, which caused no trouble for a day or two, till from the irritation of the boot, the part ulcerated, the foot and back of the ankle and leg becoming swollen and inflamed.

On admission, there was, over the outer aspect of the heel, a small

ulcer, a little larger in size than a shilling, irregular in form, and discharging a little watery pus. The surrounding tissues were swollen, the skin red and irritable, the erythema extending up as far as the calf, while the inguinal glands were slightly enlarged and tender. The foot was in a very dirty state, the patient suffering from excessive bromidrosis, causing a most offensive odor. The part was well washed with carbolic lotion, the wound dressed with carbolic oil and lint, and the leg dusted with starch-powder and enveloped in cotton-wool, full doses of the tincture of the perchloride of iron being given internally. This acted well, and in ten days the wound had healed, and the erythema entirely disappeared. On July 8, the patient complained of feverishness and pain in the right hand and forearm, which soon became erysipelatous as far as the elbow; this was treated by the application, on lint, of a lotion of sulphate of iron (one drachm and a half to a pint of water), the tincture of the perchloride being still continued (internally). It disappeared in a few days, when the disease reappeared in its original seat.

Again the patient improved; but, on July 17, he complained of a sore throat. Erysipelas manifested itself on the right side of the face and head. The mouth, tongue, and fauces became dry; and, on the 20th, he had difficulty in swallowing. The breath had a most loathsome smell, although the mouth and throat were frequently washed with a weak solution of carbolic acid in spray.

On the morning of July 22, saliva began to flow again, but the difficulty in swallowing still continued, the back of the pharynx being in an ulcerated condition, and the voice was very husky. Black patches began to appear round the inside of the lips and on the tip of the tongue, and these spread very rapidly. The carbolic spray was continued at frequent intervals, alternated with a strong solution of chlorate of potash, which was also given in twenty-grain doses internally. By this time, he had become very weak, and stimulants required to be freely administered; notwithstanding which, and every possible attention, he rapidly sank, and died from exhaustion on the afternoon of the 23d. The gangrene of the mouth had spread very considerably over the inside of the lips, extending to their junction with the gums, and the tongue, as far as the middle, where a line of demarkation seemed to run round the whole circumference, forming quite a slough, of a very dark gray color, from which a thin sanious fluid, with a horrible odor, exuded.

There was no appearance of gangrene on any other part of the body; and the case is of interest, I think, as showing an example of cancrum oris in the adult.—*William Brydon, M.B., C.M., House-Surgeon to the Hertford British Hospital.*

Subnitrate of Bismuth for Cancrum Oris.—Dr. C. J. McGuire, of New York (*Medical Gazette*), claims specific action for the local application of subnitrate of bismuth for cancrum oris.

Nineteen children were attacked with the disease. Dissatisfied with the results of his treatment in the four first cases, he determined to try the effects of subnitrate of bismuth applied externally to the affected parts. The result was the immediate improvement in the appearance of the ulcers, and eventually a complete cure. From the first appearance of the disease in the institution up to the present

time twenty-four cases were treated, including the four that proved fatal; out of twenty cases treated with subnitrate of bismuth only one resulted fatally.—*Med. and Surg. Reporter.*

Luxation of the Lower Jaw.—The next case is one of luxation of the jaw. This man has had the accident occur on several occasions. Both condyles, or only one, may be displaced (bilateral or unilateral luxation). When the luxation is complete, the condyles are carried over the eminentiæ articulares into the temporal fossæ. The lower jaw is then in front of the upper, but perhaps not so much as you would think. The dental arches are sometimes slightly and sometimes widely separated, the jaw is fixed and immovable, the saliva flows over the lip, and the patient is incapable of speaking.

The symptoms that I have just detailed do not correspond with the condition present in this man. He can open his mouth, which he could not do if he had a complete luxation, but he cannot shut it. If, in a complete luxation, you put your finger in front of the ear, you will find a depression where the condyle should be. As I move this man's jaw, I feel the condyle moving under my finger, a little in advance of its usual position. This is, therefore, partial luxation, in which the condyles rest on the eminentiæ articulares. Partial luxation occurs generally as the result of an unusual relaxation of the muscles of mastication, or of elongation of the ligaments.

In the reduction of this luxation, it is generally necessary to guard the thumbs by wrapping them with a towel, or something of the kind. The first thing to do is to place the thumbs on the molar teeth of each side and press the jaw directly downwards, so as to disengage the lock of the coronoid processes under the zygomatic arch. As soon as the muscles have been elongated, the chin is to be elevated, and the muscles will then draw the jaw into its place. [The doctor here reduced the luxation in the manner described.] It is always well to direct that a bandage be tied around the head, in order to fix the jaw. The jaw is very easily displaced after it has been once out.

The late Professor Gibson used to tell a good anecdote in regard to luxation of the jaw: "An old and quite wealthy man came into the office of a surgeon, with a luxation of the jaw, and made motions to have it reduced. The jaw was reduced, and on being asked the fee the doctor mentioned an amount which the man regarded as entirely too much, and insisted on its being reduced one-half. The surgeon said no more about the fee, but began to talk, and pretty soon told a laughable story. The man began to laugh heartily, and out went the jaw. He again made signs to have it reduced, but the doctor said, 'When you pay down my fee, I will put in your jaw.' " —*Clinic of Dr. D. Hayes Agnew, University Hospital, Phila. Med. Times.*

Ossified Sarcoma of the Lower Jaw.—W. G., aged 50, was admitted on May 9, 1881. About five months previously, he noticed a pricking pain about the left side of the lower jaw; and soon a lump appeared outside the bicuspid teeth; it grew steadily but slowly until one month before admission. At this time, the patient had several teeth extracted, and the increase in the size of the growth

became rapid after this interference; there was constant gnawing pain. The patient believed exposure to cold to have been the cause of the swelling. Both his parents died of "old age," and had no kind of tumor.

On admission, the lower part of the left cheek bulged outwards considerably by a very hard rounded swelling, which covered the outer side of the left half of the lower jaw from a short distance in front of the angle almost to the left canine; the lower edge of the bone was concealed by slight projection of the mass below it; and, on pressing upwards in the submaxillary region, a considerable swelling could be felt on the inner side of the bone. Altogether, the impression conveyed by the fingers was that the growth was central, and that the so-called expansion of bone had occurred over it. No teeth were present on the left side behind the canine, the alveolus was widened, and presented posteriorly several low, rounded swellings, covered by mucous membrane, soft, or even cystic; while in front lay a large crater-like ulcer, at the bottom of which no bone was bare. The tongue and floor of the mouth were normal. A small not tender gland could be felt behind the angle of the jaw. There was moderate constant pain in the part, much increased by hanging the head down. As regards general health, there was nothing to be desired.

On May 11, ether was given, and the growth removed by an incision from the left angle to the symphysis; the jaw was sawed through to the left of the symphysis, the soft parts stripped from the growth, and then the bone was divided near the angle. The wound was closed by wire sutures, and dressed with cotton-wool.

On the second evening, the patient's temperature was 102.6°, and on the third, 103°; till the eighth it was 100°-1.6°. Slight œdema of the cheek and eyelids appeared on the third day, but soon subsided. The wound was all but healed on the eighth, quite so on the twentieth, when the man left hospital, feeling quite well.

The growth was smooth on the surface, and covered by a thin layer of fibrous tissue; it was subperiosteal, not central; and on the inner side of the jaw lay two long oval masses, parallel to the mylo-hyoid ridge—one above, one below it. A section of the large outer mass showed it to consist of solid bone, much denser than ordinary cancellous tissue, surrounded by a margin of soft greyish-yellow tissue, nowhere more than a quarter of an inch thick. Vertical striation was plain in this border, and was in part due to spicules of bone. On the alveolar border was a layer of similar soft growth, one-third to half an inch thick. Microscopically, the growth consisted of rather large, round and polygonal cells, surrounded by bands of spindle-cells, and tracts of fairly-developed connective tissue; so that to the naked eye a section, seen by transmitted light, was made up of distinct lobules. The above description refers to the thin soft layer on the surface, and even in its substance dots of bone were numerous; while at its base lay a large mass of deep yellow bone, fairly dense, having large lacunæ and ill-developed canaliculi; tumor-cells occupied the cancellous spaces.

Soon after leaving the hospital the patient's face swelled a good deal, and it was thought that recurrence of the growth had occurred; but a sequestrum worked out, and the swelling subsided. In three

months, however, he was re-admitted having had a distinct recurrence for six weeks, with much constant pain. His health was still very good.

On September 6, 1881, the left side of the face was now swollen from two inches below the line of the jaw to above the level of the ala nasi, and from the symphysis to the lower end of the ramus of the jaw. On looking into the mouth, two large firm masses of growth were found—one above the old scar, lying in the cheek, and running back almost to the anterior pillar of the fauces; the other below the scar, occupied the floor of the mouth. They were separated by a deep groove, at the bottom of which was a little ulceration; elsewhere the surfaces of the growths were slightly lobulated and covered by mucous membrane.

No large glands were felt. On the following day, the whole of this mass, together with the ramus, coronoid process, and condyle of the jaw, were removed by the ordinary incision for the removal of half the lower jaw.

The patient again recovered without any bad symptoms; his temperature rose to between 100° and 101° four times only. The hinder part of the wound gaped widely, but it was healing steadily, and there was no obvious recurrence on October 8, when the patient left the hospital.

The left angle and ramus of the jaw were surrounded on all sides by masses of new growth, in which there was very little bone, as far up as the base of the coronoid process. In the mass which lay below the scar, unconnected with the jaw, there was a large proportion of bone. Microscopically, the growth was very similar to the primary one; there was less division into lobules, and the cells were, perhaps, smaller; the bits of bone seen were much less perfect.

On January 30, 1882, the patient was again admitted, having noticed a recurrence of the growth two months. The left cheek was now enormously swollen, and the angle of the mouth pushed forwards by a mass of new growth, fungating into the mouth along the line of the jaw, but elsewhere covered by mucous membrane. The old wound was healed, but for an ulcer an inch and a half by half an inch, round which there was a good deal of firm infiltration at its posterior end. The growth was firm and elastic at some points, bony at others; adherent to the symphysis, but not very firmly. The whole face was œdematous; the left temporal fossa rather full and the seat of much pain. The man was still pretty strong.

On February 2, the old incision was opened up, and the main part of the growth turned out. As the skin was stripped up, the hair-bulbs could be seen springing out of the tumor; then a piece in the floor, on either side of the frenum, was removed, and the two ranine arteries cut and tied. When the tongue had been drawn forward by a string, the symphysis was removed to just beyond the right canine tooth; and, finally, an attempt was made to remove the posterior end of the tumor; but, as it here seemed to involve the tonsil and carotid vessels, and to spread into the temporal fossa, much had to be left.

Again the patient made a good recovery, his evening temperature for the first week being between 100° and 101°. The anterior part of the wound healed, but the posterior gaped widely, and he went

out with a large hole here. Pain in the temporal region continued. He died at home on April 5, having been able to walk up and down stairs to the last.

The total duration of the disease would, therefore, seem to have been about seventeen months. A section from the second recurrence was more densely round-celled than either of the preceding specimens; slight traces of lobulation remained, and there was a large amount of rudimentary bone. Throughout, the vessel-walls were formed by cells of the new growth.—*University College Hospital Reports in Brit. Med. Jour.*

Treatment of Scurvy.—A correspondent writes to the *Brit. Med. Jour.* reporting the following case:—

A young man with spinal disease had all the signs of sea-scurvy, spongy gums, etc. I ascertained that vegetables had been repugnant to him, and for a long period he had refrained from taking any. The use of vegetables and turpentine, with potash, both cheap remedies, wrought a speedy cure. I beg leave to suggest these drugs upon an extensive scale, as on shipboard. I believe alkalies more effective when not given in a state of chemical combination likely to neutralize the effect.—*Med. and Surg. Reporter.*

Death from Chloroform.—William Joseph Shea, aged eight years and six months, died in the office of Dunbar Ross, dentist, in the city of Quebec, Canada, while under the influence of chloroform, given by Dr. Russell for the purpose of having teeth extracted, on the 18th day of October, 1882. The boy was strong and healthy. He was placed in a dentist's chair and about a teaspoonful of chloroform was administered on a napkin, in the space of about a minute, when he became excited, and shouted and worked himself out of the chair. He was placed in the chair again and about another teaspoonful of chloroform given, when his head fell over to one side. Unfavorable symptoms appearing, with a pair of artery forceps, the doctor pulled his tongue well forward, and nitrate of amyl was applied to his mouth and nose. He continued to breathe and the pulse to beat feebly for about two hours, during which time means were being used to restore him, but all hope of reviving him ceased. At the post mortem the lungs were found highly congested. All the other organs were sound. Death was said to be due to syncope or paralysis of the heart.

The coroner's verdict was that he came to his death from the effects of chloroform. Dr. Russell is a graduate of the University of Edinburgh, and had been in the habit of giving chloroform for a period of thirteen years.—*Abstract from Local Paper.*

Bad Effects of Iodoform.—In view of the increasing use of iodoform in the hospitals of Europe and America, the effects of this new agent are worthy of careful study. It is spoken of as a rival to carbolic acid or superior to it; hence, its good and bad effects should be known as widely as possible. Dr. Fifield presents to the attention of the Boston Society for Medical Improvement, the consideration of a case of death in his own practice which he thinks was the result of a careful application of a very small quanity to ulcerated surfaces.—*Medical Investigator.*

HEMORRHAGIC DIATHESIS.—Dr. R. A. Cleeman had under his care a young man who had previously suffered from profuse hemorrhage for two days, consequent on the extraction of a tooth: the hemorrhage was finally stopped by Dr. Hartshorn, who plugged the cavity with a styptic. Dr. H. advised the young man never again to run the risk of a hemorrhage of any kind, as it would probably prove fatal. Recently he had been suffering severely from a toothache, which nothing but extraction could relieve. Dr. Cleeman put him on gallic acid internally, and tannic acid locally, for two weeks before the extraction, which was accomplished without any unusual loss of blood.—*Reports Obstetrical Society of Philadelphia*, *Phil. Med. Times.*

HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

FRACTURE OF SECTIONAL BLOCKS.—T. L., in the DENTAL COSMOS for December, under the head "Hints and Queries," complains of fracture of sectional blocks after vulcanization. Awhile ago this subject was discussed in a society meeting which I attended, and, having had considerable trouble with the difficulty, I proceeded to investigate the causes that led to the result mentioned. I found that in grinding my sections I was not making a square joint from front to rear, but, bringing them together in front, I left the rear open. Now, the front of the gum is convex, and when ground in this form the sections only touch each other at one point. My experience is that the fracture takes place from a point about midway between the top and bottom of the gums, and extends, it may be in a direct line, clear along the section, or, running to the top edge, detaches a triangular piece. Now, if there is any shrinkage or contraction of the rubber on cooling and the sections have been ground as above stated—viz., so that they meet at only one point, leaving the tops unfortified by mutual support—it is very evident that such fracture must take place, especially if the rubber overlaps the top of the section. Since my adoption of this theory I have taken great pains to grind my sections so that there shall be a good joint front and back, and then grind out a portion to within from about a sixteenth to a twentieth of an inch of the front, leaving a V-shaped groove in each joint, in which, before packing, I run a little thinly-mixed plaster. By so doing I have avoided anything like broken gums or sections. I have had sections fracture from top to bottom even to the cutting-edges of the teeth. But I think this is due to carelessness in packing or in taking out the plaster.

Flaking of the gums can, in my opinion, be caused by a similar mode of grinding to that mentioned in the first part of this article.—J. H. BEEBEE.

FRACTURE OF SECTIONAL BLOCKS.—T. L.'s query in the December number of the DENTAL COSMOS interests me. It recalls a troublesome experience of my own. After working with a certain make of teeth and rubber with uniform success right along for years, all at once I began to have trouble with fracture of the

blocks. This occurred after removal from the vulcanizer, and all my efforts failed to discover the cause. I became almost disheartened, when luck again came to me, and without having consciously changed my method or material, cases one after another came out perfect. Now-a-days it is one of the exceptional—very rare—occurrences for a block to break. The thing that fretted me while this ill luck was happening was that my neighbors, who were using the same manufacture of teeth and rubber, informed me that they never had any trouble. Since then, every now and again I have been consulted by some one who was repeating my experience, as it seems T. L. is doing now. I would like to help him. At all events, let me make the following suggestions: The trouble probably arises from the fact that he uses a good quality of rubber, which, having little foreign matter in it, has, as an offset to its advantages, the disadvantage of greater contractility, and draws closely around the pins and at the upper edge of the gum. To remedy this, let him make that point the weakest part of the blocks by grinding it very thin, beveling it from the point backward, and not allowing the wax to extend beyond this bevel, so that if anything breaks, it will be that small portion hidden by the rim. Another cause for breakage is making too nice a joint at the shoulder where the pins are inserted. This should be ground away, and the space filled with plaster, to allow the arch to contract on cooling. The dark appearance of the joints can be prevented by covering the back with a narrow strip of pink rubber, and packing against it.—B.

Answer to T. L.—If you are sure your sectional blocks are not broken when taken from the flask after vulcanization, don't fracture them by trimming and filing the surplus rubber too roughly. A slight "chutter" of the file is often sufficient to cause a fracture.—E. J. R.

To Mount Corundum Disks or Wheels.—In reply to W. W. J.: Take a blank mandrel for the dental engine, and with a file roughen the surface; or take one such as are sold at the depots, having a gimlet-point; warm the end, so that when dipped into powdered shellac, enough will adhere to it to thoroughly coat the surface when held in the flame of a spirit lamp. Place the end into the hole in the center of the disk, and allow it to set. Insert the mandrel into a handpiece and warm it sufficiently to soften the shellac; then revolve the disk by the engine, and true up the wheel with the finger as it runs, keeping the disk in motion until the shellac is cool.—S. T.

The Combination of Gold and Amalgam as a Therapeutical Agent.—In the October (1882) number of the *Ohio State Journal of Dental Science*, Dr. Watt, in replying to Dr. Pease's paper on amalgam, quotes a case of a patient of his who suffered from irritation of the pulp, due to galvanic action by wearing gold and amalgam in the same tooth, the filling having been inserted by an itinerant Yankee.

Having systematically used gold and amalgam in *combination* for a number of years, with marked success, in cases where some positive therapeutic measure was demanded to stop the ravages of disease, as for instance in caries located at the cervix; in young tooth-structure, or in teeth poorly calcified, I am led to believe it a specific as a prophylactic if physical and physiological laws are observed in its employment.

In the case reported by Dr. Watt my diagnosis is that the patient was suffering from pulpitis, induced by thermal influences. The removal of the metallic filling and the substitution of a non-conductor like Hill's stopping prevented the irritation from thermal changes, and if a capping of oxyphosphate of zinc had been

introduced under the metal, and the patient had avoided all extremes of temperature for a time, nature would have done the rest, and a cure been the result. I assume, of course, a vital condition of the pulp, though Dr. Watt does not state what was the pathological condition other than that the tooth gave the patient great pain. The Yankee may have filled over a partially or totally devitalized pulp.

In cases where an amalgam filling is sealed over by gold, I believe irritation might follow in certain cases, such as an acid systemic condition with an acid saliva, but where both metals are exposed to the oral secretions, I cannot conceive of any galvanic action upon the dentine. There is doubtless in such cases slight galvanic action, but it is *confined to the metals.*

In using amalgam alone I find that, by preparing it with mercury into which has been rubbed say thirty to forty per cent. of gold—sufficient to form it into a pasty mass—heat is evolved in the first stages of its crystallization. This would seem to indicate chemical union, and I think the oral secretions can have very little corroding action upon its surface.

Two years ago I read a paper and gave a demonstration before the Odontological Society of Pennsylvania of the combination of gold and amalgam, showing how they could be used with advantage to both patient and operator in compound cavities, or in cavities in approximal and grinding-surfaces, condensing the amalgam with a light mallet, following with plain soft foil in cylinder form, until the mercury line was passed, and finishing the depth of the enamel with hard cohesive gold; or, by another plan, allowing the amalgam to crystallize and using it as a matrix, thus converting a compound into a simple cavity, and finishing with gold. Last July, at Williamsport, at a meeting of the Pennsylvania State Dental Society, I read a paper and demonstrated the advantages of combining gold and amalgam in filling large compound cavities in the approximal and grinding-surfaces of a second superior bicuspid and first molar for Dr. W. B. Miller, of Altoona, assistant secretary of the society. In reply to a recent inquiry as to his experience with these fillings, Dr. Miller says that with the exception of a slight periostitis of short duration, he has suffered no inconvenience whatever; that from his own experience and practice he is favorably impressed with the advantages of combining gold and amalgam, that he has adopted the method in his own practice; that he believes it to be not only a saving of time and of nervous force of both patient and operator, but a valuable therapeutic measure in the preservation of the natural teeth.

Many who saw these operations performed upon Dr. Miller will be gratified to know that they have proved successful and that the gentleman himself, who has the reputation of being a beautiful manipulator of cohesive foil, shows by adopting the method his belief that mechanical and physiological laws do harmonize, and that, as Dr. Watt puts it, "truth and simplicity are twin sisters." The principles underlying the laws of health and life, and as well the influences which tend toward disease and death, are still somewhat obscure, but we formulate laws as the result of experience just in proportion as we appreciate uniform results from like conditions; and, though beautiful but fallacious theories of other days are thus overturned, we must be willing to learn what experience teaches us.

Teeth do not decay by chance. Inherited defects or tendencies, or personal neglect, may cause pathological conditions, but like causes operate with like disadvantage upon all the organs and tissues of animal life. All development, and not less all disease, and restoration to ease or health, is under the dominion of law,—vital, chemical, or mechanical. Aitkens defines disease to be "a deviation from the state of health, consisting for the most part in a change in the properties or

structure of any tissue or organ which renders such tissue or organ unfit for the performance of its actions or functions according to the laws of the healthy frame;" and the same author defines therapeutics to be "the action of remedies upon the diseased economy, or the means by which nature may be aided in her return to health." If carious teeth are to be cured, it must be through a recognition of the fact that caries is a disease, and that the cure must come through therapeutic influences. Beautiful operations are not to be underrated, but the principal fact to be considered in the treatment of a diseased tooth is how to cure the disease. There are some conditions in which, with our present light, we are compelled to partially destroy the circulation or life of a tooth to save its body. It was demonstrated years ago that a tooth has an inside and an outside circulation, independent of each other. We destroy the nutrient supply to the inside, and by filling preserve the tooth from disintegration or decay; but caries and decay are not the same thing. Decay means to rot; caries means quite another thing. Devitalized teeth are subject to decay, but not to caries. Vitalized teeth are subject to caries, but not to decay. The same conditions in the mouth may lead to both these processes, but the processes differ. In the one case there is dissolution, and the formation of new chemical compounds; in the other we have, in addition to the former process, all the phenomena of vital tissue in relation with the arterial and nervous circulation of the organism. To cure diseased vital teeth all manipulation, whatever it may be, is therapeutic in character, even though it be seemingly only mechanical. When we expose the dentine of a vital tooth, we expose its circulation, for the basis-substance consists for many years of but slight partitions, while fibrillæ and nervous reticula pervade its every part. Under certain conditions, dentine is converted almost entirely into basis-substance, yet with wonderful recuperative energy, as has been shown in the tusk of the elephant in which bullets have been entirely inclosed. Manipulative ability is successful in the treatment of diseased teeth just in proportion as we make an intelligent diagnosis of the individual case and the application of the proper therapeutic remedy.

In order to make a foreign substance held in living tisssue not only bearable but beneficial, we must study individual idiosyncrasies and acquire experience by watching the curative influences of our treatment, so as to discriminate as to materials, with reference to their adaptability to different ages or stages of tooth-life. Simply to fill a hole in dentine without regard to the peculiarities of the individual case is nothing more nor less than empiricism.—H. C. Register, M.D.

Loose-Rolled Gold Cylinders, and their use.—We hear much of late about leaf-foil, both cohesive and non-cohesive, as being greatly superior to all other forms of gold, such as pellets, blocks, cylinders, etc. It is not my purpose to say that foil is or is not the best form; but I do wish to say a few words, based on several years' experience, about one form at least of prepared gold.

Cylinders are condemned regardless of size, construction, or quality, as if they were all alike, while there are, I might say, scores of different makes and qualities. In order to get the most benefit from any kind of filling-material we must accustom ourselves to its use, learning how to overcome its peculiarities and profit by its special qualities. Having used gold in the form of cylinders for the last nine years, to the exclusion of all other forms, and in that time using only three different kinds, one of which I have now used for more than four years, I believe I can speak with propriety of its merits.

The particular kind of gold of which I wish to write is not new, because most dentists have used "Globe Gold Foil;" neither do I wish to convey the idea that I

believe this particular make better than any other, but it is certainly good. The special form of this gold here spoken of is "Pack's Semi-cohesive Loose-rolled Crystal-foil Cylinders," No. ½ or 1. This is a very long name but every word means something, and were this gold deprived of the property or quality expressed by any one of the above adjectives its usefulness would be greatly lessened. It is generally admitted that plain foil folded and cut with the shears is greatly superior to the cylinders. Why is it? There are many reasons, some of which I will enumerate. Many who use foil have never used gold in any other form, or at least not enough to acquaint themselves with it, and they condemn the cylinders because they know nothing about them. Those who think they know probably experimented with them when cylinders first came into vogue, but every one knows who now uses them, that they are greatly superior to those first manufactured.

It makes a wide difference what kind of gold is used. *Hard* cylinders of any form or size I would condemn, because I believe it the duty of the operator to condense his own filling and not have it done by wholesale. Neither do I advocate large cylinders, because they do not fill the bill; but the size of cylinders that should be used in most cases is No. ½ or 1.

Semi-cohesive gold requires no extra heating, but will unite by simple contact, although in contouring it is well to re-heat, which makes it extra-cohesive. It is so soft and pliable that it conforms itself with great exactness to the irregular walls of a cavity. It does not require great force to condense it—in fact a beautiful filling can be made of it by hand-pressure alone. We should remember that in many cases the walls of cavities are frail and brittle; hence if we carry the wedging principle too far we are liable to spring and check the marginal portions of the cavity.

To get the best results with any form of gold requires judgment, more especially as to the size of the plugger-points. When a filling is inserted by hand-pressure, gold cannot be thoroughly condensed with a large-faced plugger-point, for the reason that only the most prominent points of that portion of the filling already inserted will be brought into contact with the additional piece or pieces, but if a small-faced point be used, the gold is forced into the depressions, thus forming a solid mass. To obtain the best results the practitioner must work with the greatest precision and delicacy about the margins of the cavity, and this cannot be accomplished with the mallet in any form.

I cannot understand why men, whose judgment seems to be so sound on everything else, should in the use of the mallet display such ignorance. They say you can pack more gold into a given cavity by the use of the electric mallet than by any other process, just as though it was our aim to give our patients the value of their money in gold foil, regardless of the ever-existing conditions debarring us from such a course, and leading one to suppose that the greatest good to ourselves and to those for whom we operate depends upon the greatest power we can bring to bear in crowding and cramming the precious metal into the cavity. I believe rather that our ultimate success lies in the reverse of this,—that is, to crowd as little as possible, bringing very little, if any, pressure upon the walls of the cavity, and in order to do this to use that form of gold which requires the least force to consolidate. I think that successes are ten to one in favor of this kind of gold, manipulated by hand-pressure instead of the mallet, no matter how light the blows may be. The mallet is a good thing in its place, but it is in the majority of cases out of its place in the insertion of gold filling, where cohesive-gold is used in the form which I have referred to. In conclusion let me say that these cylinders have not the least resemblance to a rolled-up blanket, although that comparison has been lately made by a member of the profession.

I have referred to this gold because I desire to see the cylinder where it really belongs—at the head, as a form of gold in filling teeth.—M. A. WEBB, *Marengo, Ill.*

WISHING to satisfy myself as to the relative strength of malleted and non-malleted gold plugs, I made the following experiments: I took two unused shoe eyelets, which might be described as conical cylinders, with a caliber at the small end of about ten, standard wire gauge. I filled one of the cylinders with gold, beginning at the base and filling to the apex, then leveling the surface with a foot-plugger, I placed the other cylinder on the first, the two small ends together, and continued the filling into the second cylinder until I thought the gold would not pull out. Having now a couplet united by the cohesion of two surfaces of gold, I suspended it to a fixed point by its upper half and attached a scale-pan to the lower half into which weights were placed until the two cylinders separated. The malleted couplet sustained a weight of twelve pounds five ounces. The hand-pressure couplet sustained seventeen pounds fourteen ounces. These were the greatest weights sustained out of a series of six experiments—three of which were malleted, and three not malleted.

The gold used was the "Globe Foil," extra-cohesive, and it was annealed by passing through the flame of a spirit-lamp in the usual way. The mallet was a Snow and Lewis automatic. By "hand-pressure" I mean only what can be quite easily exerted with an ordinary mallet-plugger, held between the thumb and fingers like a pencil, *not* resting against the palm of the hand.

I also made one experiment *without* leveling the surface of the gold with a foot-plugger, building the gold through the two eyelets in one continuous piece, thus resembling more closely a cavity plug, and using hand-pressure. This couplet sustained twenty-one pounds eleven ounces, and then pulled out of the eyelets instead of separating.

These results were a surprise to me. I had always supposed that malleting increased the cohesive strength of gold, although I was beginning to believe that it did not increase it so much as most operators supposed. But these experiments indicate that the opposite is true—at least in my hands. It is probable that other operators more skilled in the use of gold can show better results than these. But any results will be largely influenced by the operator's habit,—that is, he will be likely to work the best with that which he is most accustomed to use. I am led to the conclusion, however, that, given the same skill in both cases, malleting has no advantage over hand-pressure.

I do not offer these experiments as any thing conclusive; each operator can test his own capability. I think, however, if the time spent in acquiring skill in the use of the mallet was spent on hand-pressure, the results would be quite as good.

My own experience in malleting, both in the chair and by the chair, is that it is extremely unpleasant, and many patients can scarcely endure it. If it can not be demonstrated that it is beneficial to the plug it should not be used.—A. MORSMAN.

ASBESTOS FELT-FOIL FOR LINING CAVITIES.—About a year ago I received from the hands of a professional friend a piece of asbestos felt, which he recommended as a lining for cavities. My first experiments with it were to line cavities which were to be filled with amalgam. It answered the purpose admirably. The next application of it was for the covering of recently-exposed pulps, placing over it a cement of phosphate of zinc. So nicely was this covering tolerated, that for the past six months I have used it almost exclusively over healthy pulps

with recent exposure. In cases where a stimulant or escharotic influence was indicated, I have moistened with oil of cloves or carbolic acid, the former in many cases being preferred. For the last few months I have packed it firmly into large cavities having a surrounding wall, and inserted gold fillings upon it. It has the advantage of gutta-percha in being a non-conductor, but is more satisfactory than it by virtue of allowing a more solid filling—one upon which gold can be consolidated without danger of rocking and displacement in mastication. This foil has a firm fiber; is quite indestructible, resisting decomposition when in contact with the secretions of the mouth. I recognize in this asbestos cloth a material which may be utilized in many dental operations, helping to lessen the exhausting labor to which a dentist in full practice is so continuously subjected.—C. N. PEIRCE.

CURIOUS ABNORMALITIES.—A few weeks since, after having completed some operations upon the inferior teeth for a lady who had for over six years been wearing a full artificial denture, my attention was drawn to the fact that the patient had been at intervals suffering from pain, soreness, and swelling located on the left side, just below and anterior to the ear. Upon examining the alveolar ridge with a small mouth-mirror, nothing was discernible, but on placing the finger upon the buccal surface of the ridge, and almost posterior to it, a hard prominence was discovered just beneath the mucous membrane. Upon passing a sharp-pointed instrument through the soft tissue, an enamel surface was readily detected. A free incision was made through the gum and alveolar ridge, when the outline of a tooth was recognized lying in a completely horizontal position, and at right angles to the line of the ridge. The crown and cusps presented towards the buccal surface, and the roots were imbedded in the posterior end of the alveolar ridge. With a pair of sharp-beaked forceps this tooth (supernumerary, as it proved to be,) was removed. A second examination discovered a miniature tooth dislodged by the removal of the first, and which, upon viewing it with a lens, was found to be similar in outline to the first, but with the apical end not fully formed. A third examination with the probe gave unmistakable evidence of the presence of a third tooth, which, like the first, was in a horizontal position, with the crown extending posteriorly directly on a line with the ridge, and the roots imbedded above the roots of the first tooth removed in the posterior extremity of the alveolus. This third tooth, which was extracted, was undoubtedly, judging from all of its peculiarities, a legitimate third molar. The two larger teeth, when out of the mouth, fitted nicely together, with their crowns at right angles to each other, while the miniature tooth, which was less than one-eighth of an inch in length and proportionately developed, fitted accurately into depressions in and between the two larger teeth. These abnormalities, in number, location, arrangement, size, and conformation, are interesting for consideration, both as regards their origin and development. The three germs giving rise to these peculiarities must have had their origin successively, and have developed from independent centers, to have been so admirably calcified and to have maintained so thoroughly their individuality.—C. N. P.

TO RE-"STIPPLE" CELLULOID.—Should the "stippled" surface of a celluloid plate become marred, so as to require dressing to a surface and polishing, the "stippled" appearance may be reproduced by going over the polished surface with a small round bur rotated rapidly in the engine, "dotting" it as the tin-foil is done previous to flasking.—B. H. TEAGUE.

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ORIGINAL COMMUNICATIONS.

DISCRIMINATION IN THE SELECTION AND USE OF FILLING-MATERIALS.

BY D. D. SMITH, D.D.S., M.D., PHILADELPHIA, PA.

(Read before the Massachusetts Dental Society, Boston, December 14, 1882.)

WHEN solicited by your committee to read a paper at this meeting, assent was given with the understanding that it should bear upon some subject relating to *practical* dentistry. In accordance therewith, attention is invited to the importance of discrimination in the selection and use of filling-materials.

The observations of years steadily confirm the opinion that too little attention and study have been given to this important matter. Perhaps nothing in dentistry is more the subject of caprice, prejudice, or fancy, than the selection and use of materials for filling in given cases. How often we feel constrained to say of our own efforts, as well as of those of others, "what an injudicious selection for a filling in this case." A matter which should be governed by certain fixed principles established by experience and in harmony with ascertained laws is too frequently made rather to suit the manipulative capacity, the convenience, or the conceit of the operator.

Not re-decay nor failure, not even the steady loss of teeth, seems to shake the teaching so persistent in our literature, that "the filling-material the best known for given cases is therefore necessarily the best for all cases and all conditions."

Decay and re-decay, as though in defiance of the dentistry of the present, still waste and destroy human teeth. The fact meets us almost every hour and every where, and yet we imbibe and cling to the prejudices and practices of those whose *dictum* we have been accustomed to follow without question. There is no surer way of perpetuating the errors in the teachings of the past (and that there are errors grave and serious there can be no question) than to blindly

follow the methods of those essaying to teach, to the neglect of all careful study and investigation ourselves of the phenomena constantly passing in review under our observation.

Probably no earnest worker in dentistry can look back on any year of practice and feel that the success achieved was all that was desired or hoped for, and yet how many have paused and studiously investigated the cause of any given failure or series of failures? It is easy, looking at want of success, to say, "This is not what I had hoped, not what I expected, but this treatment is in accordance with approved teachings and must be the best. Surely I am not responsible for this failure." But if we would *baffle decay* we must throw aside the prejudices of our earlier education and accept facts as they exist.

The demands upon dentistry arise out of numerous causes, among which I may mention, faulty organization and construction of tooth-tissue, slow and imperfect nourishment of the same, the situation and surroundings of the teeth, and the circumstances governing their use. Unlike the other osseous structures of the body, they stand continuously exposed to the destructive influence of numerous active *external* antagonistic agencies, to which they offer resistance in proportion to their consolidation, vitality, and use. An enfeebled condition of the teeth through lack of use in our modern civilization is, we think, a prolific source of decay.

The important question for dentists to consider is, How shall dentistry best meet these demands laid upon the profession by disease and decay? Is it not so that the cases are few in which even our very best efforts give us entire satisfaction or meet our expectations? The causes of decay are so imperfectly understood, yet so numerous and so powerful to destroy, that there seems but little hope for the teeth of the masses from the local treatment of the present, and quite as little promise from any general or constitutional treatment of the future. To my apprehension, any constitutional remedies which may be devised, acting through the slow nutrition of the pulp, or, possibly of the peridentium, will never successfully oppose the rapid action of the numerous agents operating chemically upon the teeth on their external surfaces. The few instances in which a slow, smouldering process of decay in dense, strong teeth is checked by exceptional nutrition from a living pulp, furnish little or no encouragement for the use of constitutional treatment for teeth in general, when once decay is established. That the happy period looked for by a few, when suffering incident to defective dental structure shall be relieved by the mysterious prescription of the physician, is in the near future, seems hardly probable. Certain it is, that while reaching after a rational constitutional

treatment, local treatment, the only known means of intercepting decay, should be put on the safest and most certain basis possible.

The selection, then, of the most appropriate substances with which to do the work of replacing wasted tissue and of successfully warding off fresh attacks of decay, is a matter of no inconsiderable moment; and until more definite and certain results have been reached all prejudice should be laid aside, and an untiring and impartial investigation pursued without fear or favor. We are confronted to-day by two schools of dentistry: the one earnestly advocating gold in all cases and conditions, and the other in its ten propositions as earnestly contending that "in proportion as teeth need *saving*, gold is the worst material to use."

To present this more clearly, permit a quotation from a recent work on operative dentistry: "Gold. Of all the metals which have yet been used for filling teeth, gold possesses more of the requisite properties than any other, and sufficiently so for all *practical purposes*. Twenty-carat gold is seldom affected by any agencies with which it is brought in contact in the mouth; pure gold never. In the filling of teeth there are two objects to be aimed at: one, a sufficient hardness to withstand the wear of mastication; the other, a thorough protection of the cavity against all decay-producing agents. For the attainment of the first of these, gold is not all that could be desired; yet it is perhaps as efficient in this respect as any other metal that can be employed. But the second object, gold, when well manipulated, accomplishes very effectually,—that is, so long as the filling maintains its integrity; after it is partially worn out, it thus far fails, of course.

"In adaptability, too, gold is superior to any other metal. It can be wrought into a variety of forms, with any of which very good fillings can be made. It can be perfectly conformed to any shape of surface, however irregular. A tooth that can be filled at all can be filled with gold. This assertion was made a number of years ago, and if it was true then it is much more true now, for then the *cohesive* property of gold was not employed at all or even recognized as available; but now this property has been rendered efficient and practicable. * * * * Formerly an ordinary gold plug, when removed from a cavity, could be separated into as many pieces as composed it; but now when cohesive gold is skillfully used, the mass composing a filling cannot be divided into its original parts, but may be wrought into plate, wire, or foil. * * * * Gold is a good conductor of heat, and this is the chief objection to it as a material for filling. As to sensitive teeth this is a very serious objection, in some cases necessitating the employment of non-conducting material beneath it, and in others precluding its use altogether."

Here we see such evidences of the old prejudice in favor of *gold*—gold because it is gold—as a filling-material, that every *practitioner* must recognize them *as* prejudices, not teachings. Look for a moment at the objections which this writer finds in gold: First, it does not stand the *wear* of mastication, and when *worn* out it fails to protect the cavity. When and where does this "*wear*-out" in mastication occur with gold? Who has ever seen a case of the kind? The wear of mastication! What better protection can be afforded a *gold* filling, and not less the structure which supports it, than the "wear of mastication." Given the wear of mastication, and he must be a poor dentist indeed who cannot make gold fillings to stand and protect the teeth as well. What better material can we use when the six upper oral teeth, compelled from loss of bicuspids and molars to do the principal work of mastication, begin themselves rapidly to wear away, threatening not only pulp-exposure but loss of the entire crown? Gold, in these cases, bearing the whole weight of mastication, protects and *saves*. Its second and "chief(!)" objection is found by our author to be its conductivity; it being so great at times as to necessitate a non-conductor under it! Is it then so great a violation of professional obligations to place two filling-materials in one cavity, for the reason that we can make the tooth more comfortable and more durable by so doing? Instead of gold being objectionable because of its conductivity, experience has shown me—what I think is not exceptional—that in those cavities in which gold is really the best conserver, the tooth, after the introduction of the filling, becomes quite rapidly and completely oblivious of its presence. The objections raised *against* gold as a filling-material are thus seen to be as trivial as are the properties urged in its favor.

What impressions could one unfamiliar with the sphere of dentistry derive from such teachings. save that which seems to have fastened itself so strongly upon the profession and general public as well, that the mission of dentistry is to *fill teeth with gold!* Is it not time to withdraw all support, even by implication, of such sentiments, and to elevate another standard bearing in unmistakable characters, this: The mission of dentistry is to relieve suffering incident to the imperfections and decay of the human teeth, and to save them in their beauty and usefulness.

This done, dentistry will possess a new meaning for many, and the study of filling teeth will be, not from the stand-point of the physical properties of the filling-material, but from the adaptability of such material to the end sought, viz., the saving of the tooth. Then the *tooth to be treated*, its character and surroundings, its class, the surface and structure involved, the *extent* of the decay and the

making of filling-materials *remedial* in their action, will find a prominent place, as they should, in dental thought and discussion.

For the better presentation of the subject, let us separate tooth-structure into classes; and, while recognizing the numerous and varied grades with which we have to deal, from the compact, flint-like, decay-defying, to the fragile, chalky, decay-inviting, yet, for our present purpose, all may be classified under three heads, viz., hard, medium, and soft. It is no fanciful distinction to speak of one tooth as hard, compact, consolidated, and of another as soft, unconsolidated, fragile. The difference in the *substance* of teeth is as distinctive as are the terms used to designate it. This being true, is it reasonable to suppose that any one substance can be found which shall be equally applicable and efficient in connection with all clasess of tooth-structure and all conditions of decay? Our author quoted, says, "A tooth that can be filled at all can be filled with gold," and further adds: "This assertion was made a number of years ago, and if it was true then it is much more true now."

The plain inference from all this is, that gold is the best material with which to fill teeth, *without regard to conditions*, and that it should be *used in all cases;* and when we search for the reason why it is the best, we find it to be mainly because *its cohesive properties have been rendered efficient and practicable, so that when this gold is skillfully manipulated, the mass composing the filling cannot be divided into its original pieces*, but may be "wrought into plate, wire, or foil!" It is unfortunate for teeth, but even more unfortunate for dentistry, that, resulting from such teachings, "the mass composing the filling" so frequently drops bodily from its place in the tooth, and so is found useful only as it is again wrought into "plate, wire, or foil." This is the reason why we are to fill all teeth with gold—because, forsooth, it can be welded when advantage is taken of its cohesiveness! This teaching from a professional pen of American dentistry in 1877, has not, to my knowledge, been specially controverted or its soundness questioned, except by the bold pronunciamento of the opposite and equally extreme sentiments of the so-called "New Departurists."

Let us consider some of the cases and conditions, in their order, which demand this treatment which we call filling. It is, without question, good practice to preserve the deciduous teeth with living pulps, if possible, until the time that the process of root-absorption displaces them to make room for the second set. To do this we must frequently commence filling at three, three-and-a-half, and four years of age. In these cases we have to do with exceedingly soft, fragile, and very sensitive tooth-structure in the flooded mouths of delicate, timid, shrinking children. The worst decay is generally

between the deciduous molars—teeth with pulps near the surface, easily exposed, and very easily devitalized by filling—the latter condition followed by the inevitable "gum-boil." Possibly such teeth *can* be filled with cohesive gold, but to contend that such treatment is the best for them is equivalent, in my estimation, to the admission that the advocate of it has never tried it in practice. These same deciduous molars frequently require fillings after the roots have become one-fourth, one-third, or even one-half absorbed. Surely we have treatment at command better than to weld gold into such cavities of decay. Where, in these cases, the cavities can be kept dry for the introduction of a good gutta-percha filling, I esteem its use the best treatment we now know. The oxyphosphates may yet take its place, but their durability can hardly be said to be proved. Where gutta-percha cannot, on account of saliva, sensitiveness, or bleeding, be well used, amalgam is unquestionably the best filling. At six years of age we meet the first permanent molars—the sixth-year molars—frequently defective at eruption, and requiring attention within a few months. Decay, appearing first in the sulci, forms in them simple crown cavities. In filling such cavities, we are not confronted with the difficulties presented in filling the approximal cavities in the deciduous molars; but we have still to deal with very sensitive, imperfectly formed, and unconsolidated enamel and dentine. Admitting the possibility of filling such teeth with gold, we must ask ourselves: is it the best dentistry can do? is it best for the tooth; best for the child—now gaining its first impressions of dentistry—or best for the operator? What is the verdict of experience in these cases? Surely it is that it is best for neither tooth, child, nor operator. A good amalgam, properly manipulated, I believe to be a better preserver of the tooth, and its use far better for the child and for the operator. Considered in the light of facts, does not the saying—repeated so often as almost to have passed into a proverb—that "a tooth that is worth filling at all is worth filling with gold," seem the very absurdity that it is? Ought we not, as dentists, to endeavor to free ourselves from this yoke of bondage which compels the admission, through a slavish fear, that gold is the best filling for all cases?

If the sixth-year molars escape decay on their mesial faces until the loss of the second deciduous molars, we usually find little thereafter demanding treatment by filling until the twelfth-year molars are in place, when they, like the sixth-year, often present simple crown cavities. We have now reached an age when it is usual to find tooth-structure beginning to assume an aspect of consolidation; an age when the patient can be induced to listen to the voice of reason and when, through development and growth, the possibilities of a

perfect gold filling for these simple crown cavities have been placed within reach. Shall we now, in *these* teeth, begin the use of gold under the impression that by so doing we are always working out the greatest good for our patient? Laying aside all else, this should ever be the chief of all our professional endeavors. Begin the use of gold in these cases, I say, if the tooth has reached a fair condition of consolidation, and if the circumstances and surroundings are such as to warrant the belief that good fillings can be made. Crown cavities, in both sixth- and twelfth-year molars, with small *surface*-exposures, are well and durably filled with *tin-foil*, often better so than with gold. Tin makes its very best exhibit as a tooth-preserver in these *small crown cavities*, say from the size of a pin's head to a small pea, where there is but little surface-exposure. It will "cup" a little under mastication, but not wear out to the exposure of the cavity. It is not enough used in such cases. Large, deep cavities are better filled either with some of the oxychlorides or oxyphosphates, or, with what I regard as better than either, a good amalgam. Enough of whichever filling is used should be cut away to form a cavity for the introduction of a surface-filling of gold. This new cavity, formed by a portion of the walls of the original cavity and the plastic material just introduced, should be of a depth to permit a filling of gold from one-sixteenth to one-twelfth, or even one-eighth of an inch in thickness, according to the size of the orifice, large cavities requiring a thicker capping of gold than small ones. In forcing the gold into the fresh amalgam, some of the latter will come up around the margins of the cavity and amalgamate a small portion of the gold—a result rather to be desired than feared; for, if subsequently a dark line appears along the margin of the filling, I feel satisfied that the operation will be a success.

A method of mixing and manipulating amalgam which seems to me the only one which can give fully satisfactory results, ought not in this connection to be omitted. A good alloy—the character of which I will not now discuss—will require of filings and mercury about equal weights to make a smooth, pasty mix. Every mix of mercury and filings should be carefully weighed before being placed in the mortar, and, of course, should be graded according to the requirements of the alloy. The result of rubbing briskly in the mortar should be a thick, but well-amalgamated paste, a portion of which should be introduced into the cavity without washing or squeezing. This portion first introduced, when thoroughly consolidated, contains surplus mercury at the surface, which should always be absorbed. This is done by squeezing another portion of the amalgam as dry as can be through chamois, and then packing it upon that first placed in the cavity. By this process the amalgam can be quickly made hard,

almost or quite to the point of brittleness, the quantity of mercury reduced to the minimum, and the quality of the filling greatly improved. The idea that amalgam and gold, used in conjunction in the manner described, will occasion galvanic action, has long since been shown to be without foundation in fact. There are two conditions in the approximation of gold and amalgam fillings, in either of which, when the conditions of the mouth favor, this galvanic action is possible, viz., when in filling the approximal faces of molars or bicuspids, the mesial face of one tooth is filled with gold and the distal face of the other with amalgam, or, *vice versa;* and when, after filling, the teeth approach each other to the point, or nearly to the point of contact of the fillings—amalgam with gold. In such cases, when the oral fluids are in a favorable state, galvanic action may and does occur, sometimes manifesting itself by positive pains in the teeth. As a rule, more rapid decay of the tooth takes place about the *gold* filling, while the tooth with the amalgam filling remains intact. Again, a shock may be experienced in the teeth, the result of contact from occlusion of a large gold filling in one jaw with an amalgam filling in the other, producing great discomfort. These conditions, of course, should be avoided. That a filling of gold and amalgam in the same tooth occasions galvanic action or is productive of injury, is not in accordance with my observations. On the contrary, a gold filling in contact with an amalgam filling in the same tooth—as, for instance, gold in the crown and amalgam in the mesial or distal face of the same—often apparently benefits both cavities. The amalgam in such cases usually becomes discolored or oxidized *on the surface*, after which the greatest harmony seems to exist, not only between the fillings, but between the fillings and tooth as well.

After the eruption of the twelfth-year molars we look for decay upon the approximal faces of the teeth, more or less prompt in action in proportion to the character of the tooth-material and the process of nutrient consolidation then taking place. From the great number of mouths I see with the bicuspids (superior especially) disturbed or missing, I judge that the experience of others accords with my own, that these teeth when developed of medium or soft grades of tooth-structure are exceedingly unsatisfactory, and their preservation uncertain by the old and established methods of filling. Gold, of whatever kind or by whomsoever introduced, will fail in them sooner or later. Unless used by thoroughly competent and experienced hands its duration of usefulness will scarcely average more than eighteen months, and by the time such bicuspids have been filled mesially and distally twice, the crowns are generally so weakened as to be of little further real service. These soft teeth are commonly markedly constricted at the cervical portion, inviting decay and re-

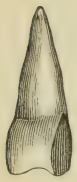
decay by their shape as well as by their faulty structure. Amalgam I have found quite as uncertain and even more unsatisfactory than gold for them; uncertain in that decay is quite as frequently re-established around the filling, and unsatisfactory in that the amalgam imparts to this class of soft teeth a dark-blue color which is unsightly in the mouth. Tin is objectionable for the same reason. Oxychlorides disintegrate and wash out at the cervical portion, leaving the cavity unprotected at the most critical point. Oxyphosphates promise better than the oxychlorides, but their value is not established. Gutta-percha is the best preserver of such cavities at the cervical margin that we know, but it will scarcely endure the wear of mastication for weeks.

What then shall we do to preserve these teeth when thus decayed? In July, 1878, it was my privilege to read an article before the Pennsylvania State Dental Society, at their annual meeting held at Bedford Springs, on "Gold and Tin in Conjunction as a Filling-Material," in which I advocated the use of tin foil along the cervical wall, and at the cervico-palatal and cervico-buccal angles of the cavity, packing it to about the thickness of a No. 24 plate, and then completing the filling with gold. This was after the promulgation by Dr. Palmer of the theory of galvanic action between fillings and tooth-structure, and after repeated trials in the mouth had shown me its value over gold alone. Some of the most successful of all my efforts to combine filling-materials, or in the use of any materials for the preservation of soft teeth, have been in the use of tin and gold in this manner. To its use in this way there are two serious objections. First, it imparts to the cervical portion of the tooth the color and appearance of decay,—so much so that in two or three instances an instrument being readily passed into the tin, I have been seduced into the removal of the fillings; without, however, finding any necessity for it, not even the appearance of softening of the margins of the cavity. The second and perhaps more important objection is, that its use requires the same conditions of dryness, shape of cavity, and delicate manipulation; the same pain and inconvenience to the patient, and the same mental and physical strain upon the operator as does the introduction of gold alone. To these may be added another though less serious objection—patients submit to it with a silent but plainly recognized mental protest. The feeling is that they are getting neither the best nor their money's worth.

In attempting to answer the question how best to preserve the soft and medium grades of bicuspids, and the molars as well, when decayed mesially or distally, allow me to direct attention to a combination of gold and amalgam similar to that just described for gold and tin, and point to its advantages over the latter method.

First, it has shown itself the equal of gold and tin as a preservative; second, it is much easier of adaptation; third, it can be used with little or no pain to the patient; fourth, the filling is much more readily introduced and finished; fifth, it does not give the discoloration *of decay* at the cervical portion.

If the use of gold in conjunction with freshly-mixed amalgam has not been attempted, it may be thought difficult of accomplishment; but experience shows that it greatly shortens and simplifies the larger and tedious operations, and at the same time adds markedly to the durability of the filling. The manner of preparing the cavity is the same as for gold alone. All fillings, I believe, should have a good, firm base, and not be made dependent on drilled retaining-points only. Mesial and distal fillings in many bicuspids and molars are practically wedge-shaped, with the base of the wedge at the grinding-face of the tooth, as shown in the figure. When built to full contour, these teeth are constantly liable to mechanical injury, and the fillings to displacement in occlusion.



To introduce and satisfactorily finish either gold or tin at the cervical margins, and especially the bucco- and palato-cervical angles of these cavities, is an operation attended often with difficulty, and accomplished only after the infliction of suffering on the patient. The amalgam, on the contrary, is readily introduced and consolidated at these points, even without the application of the rubber-dam. After the amalgam portion of the filling has been made, the dam can be applied without inconvenience to the patient, the amalgam shaped for the reception of the gold, and the filling readily completed with the latter material. By the time the gold portion of the filling is completed the amalgam will have reached the brittle stage, in which condition it may be easily and perfectly finished.

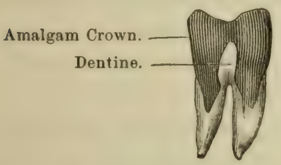
I have spoken of the larger and more complicated cavities, but a thorough treatment of this important subject requires consideration as well of the *small* approximal cavities in bicuspids and molars of soft and medium grades of tooth-structure. How shall they be filled? Possibly it may be easier to tell what materials *not* to use than what *to* use. Observation has taught me that when in this class of cases *one* tooth only is affected to the point of decay, if it is filled with gold, especially cohesive gold, the other will become involved in a very limited period, while if the same tooth be filled with gutta-percha or amalgam the adjoining tooth will resist decay for a much longer period. Small gold fillings in the approximal faces of bicuspids and molars of soft structure I have found more disappointing even than fillings of the same in the large cavities. Tin gives an unsightly appearance to such teeth and is by no means as satisfac-

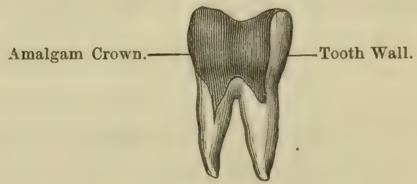
tory a preserver as when used in some other situations. Good amalgam alone, while not as objectionable in appearance as tin, is still liable to give color. Unless the oxyphosphates are used we seem shut up to gutta-percha or to amalgam and gold. The use of the latter combination is more difficult in small fillings than in large, but is not more difficult than the use of gold alone. Gutta-percha makes a good filling for these cases when the cavity is so situated that it can be protected from friction—far better I believe than gold—but a lining of amalgam with the central and coronal portion of gold will be found a better preserver than the gold or amalgam alone, and will give less color than either tin or amalgam.

Deep cavities in the *buccal* faces of soft molars, especially if with moderate orifices, are well and desirably filled with gutta-percha. If much exposed, amalgam, with a surface of gold, combined in a manner similar to that described for the larger crown fillings, will be more satisfactory.

Cavities in the lingual faces of lower molars are among the most difficult of access, and when well filled with amalgam will be found better preserved than by any other filling-material we now use.

The cases in which amalgam alone makes its best exhibit as a conserver of tooth-tissue, as I have observed, are those of badly broken or wasted crowns, more especially of molars, in which but





one wall or even a part of one wall is standing, as exhibited in the diagrams herewith: If a secure foundation can be obtained for a good amalgam filling in such cases, the crown may be built on it in the full assurance that the tooth will have a satisfactory career of usefulness.

When we approach the denser, more perfectly developed and better nourished tooth-structure in which we find decay progressing more slowly, indicated by a brown or black deposit in the cavity, experience has abundantly proved that wherever cavities may be located in such teeth, *good gold fillings*, whether made of cohesive or non-cohesive foil, will preserve them perfectly and permanently, and that in such cases its use is always indicated.

There remains but one other class, to consider specially—viz., the oral teeth. In these teeth, whatever their character, whether of the grade denominated soft, medium, or hard, I firmly believe that gold when properly used is a preserver as reliable for them as any

filling-material we now know. Tin, amalgam, gutta-percha, or even the cements, are not more so, and they are all objectionable, from giving color and more or less the appearance of decay to them. For these reasons I reject them and give gold the preference. The only exception to this is in cases of senile decay and occasionally in very early and rapid decay of children's teeth, when gutta-percha, of all other materials, is indicated; in the latter cases rather as a temporary expedient while waiting for development and hoping for consolidation; in the former as the best that can be done to keep the teeth.

The most encouragingly successful method with gold in these teeth has been that of opening into the cavity, generally without wedging, by cutting from the palatal plate of enamel, removing all decay, slightly grooving the cervical and labial walls of the cavity, and filling, not contouring, from the under surface, with cohesive gold, which when finished should be made to lap over and protect the labial plate of enamel and form a support to the cutting-edge of the tooth as well. This method of filling prevents the approximation of the filled surfaces, almost compels cleanliness, and places the teeth at the furthest remove from re-decay.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION—TWENTY SECOND ANNUAL SESSION.

Fourth Day.—*Afternoon Session.*

(Concluded from page 34.)

Section II., Dental Education, was called, and Dr. J. N Crouse, chairman, read the report, which urged the necessity of a definite standard of education, and suggested the formation of an association by the colleges to fix a standard, any college to be eligible to membership which was willing to come up to the standard. Thus, no college which had the interests of the profession at heart could be debarred, but those gotten up from selfish or unworthy motives would be effectually excluded. What the standard should be would, of course, have to be decided by a conference of the faculties of the different institutions, but the Section believed that at least two full courses of lectures before graduation should be one requirement. To allow a student to graduate on one course of lectures is to lower materially the average education of graduates, and to lessen the value of a diploma as an evidence of qualification. With such an association in existence, and with a standard requiring a two-years' course, a good English education and better training by preceptors, State boards of examiners would have no difficulty in deciding what a "reputable dental college" means. Another advantage gained,

would be the lessening of the number of colleges by the discontinuance of the worthless ones; while many of the same class prospectively in store for us would never come into existence.

Dr. Robinson. I can hardly agree with the paper just read, that we have not made any progress in the forty-six years since I began practice. I can see such marked progress in every department of science, that I sometimes feel myself hardly in place in having a seat in this body. If I were to recommend any two things as being of the utmost importance to the young practitioner, the first would be that he should be an honest man in his education, both to himself and to his patrons. The second would be, that he must be fully imbued with the dignity of his calling, and act as though he were conferring a greater favor on his patrons by giving them the benefit of his knowledge and skill, than they were conferring on him by giving him their patronage.

Dr. Atkinson. It is in vain to attempt to elevate the standard of our profession so long as we follow the old lead. The idea of time having anything specifically to do with the granting of a diploma is of darkness and iniquity. I hold that any man who can prove that he is competent, should be so indorsed by those who have the power to give indorsement. One, two, three, or ten years has nothing to do with the acquirement of knowledge, only in a very insignificant sense. I am informed that there are schools that graduate on time whether students can answer the questions or not; and we have a school in New York, that upon a threat of a pupil whom they proposed to pluck gave him the diploma. Now the colleges want a little more pluck themselves, and they want to follow my old brother Jeremiah's method of doing things; learn to be honest themselves and discriminate between applicants whether they are fit to study dentistry or not. That we have grown is evident, but have we grown to advantage? Is the fruit ripe or only abundant and green? I take it that the latter is really true, and that the men among us who have the greatest ability are not the men who are regarded as literally well educated, but the men who had had instruction by reason of the honesty spoken of by Dr. Robinson to comprehend what they were doing before they took hold of it, and then by religiously acquiring the knowledge before they offered their professional services to their fellow-men. It is this moral question that lies at the bottom—that we must inaugurate into our body as seekers for truth and as communicators of truth, if we wish to attain to a high standard of dental education.

Dr. Peirce. One word with reference to the remark made by Dr. Atkinson. He has struck the right key, but it does not harmonize with the present state of affairs. It is certainly a matter of indif-

ference to the public where a professional man obtains his education. The work-bench or the college is equally acceptable, so that he possesses the requisite knowledge. But before this system of granting degrees, to which he has alluded, can be adopted, every State must have its board of examiners and they must be beyond and above suspicion, competent in every department, and with the only authority to grant degrees or to license the professional man to pursue his calling; and for the government of this board there must be a fixed basis of qualification for the degree and an income independent of students. While our educational system is organized as to-day with the teacher dependent upon the student for his compensation and living, students must be required to spend a certain amount of time in the prosecution of their studies at college: for students to come before a board for the degree without reference to previous study, and that board depending upon the degrees conferred for a livelihood, would be a dangerous precedent to establish with the present status of humanity.

Dr. Barrett. That is the prettiest theory in the world, the idea of basing a diploma upon a man's qualifications and not upon the time that he has spent in the schools, or the place where he shall have obtained his knowledge. You have a practical exemplification of what that theory will degenerate into in the State of Wisconsin. Delavan diploma-mills may easily be the consequence. When it is left to the teachers in the schools to determine what the qualifications are that entitle a man to a diploma, some check is absolutely necessary upon the grinding out of diplomas, otherwise it lets down the bars and opens the field for all manner of fraud. In the State of New York the medical profession have attempted to take from the medical schools the authority to grant diplomas, and to confer that power upon a board which shall be in some way connected with the Board of Regents of the State University. It has not been found practicable as yet, because the colleges themselves are not agreed upon it. The medical profession, I believe, would vote for it to-morrow, and some colleges also, but others of them do not desire to have the granting of diplomas restricted in any way further than by some limitation of time of study. I hope this reform will soon be brought about, and then it may be proper and possible to grant a diploma upon actual knowledge, no matter whether the student has attended the schools for any particular time or not; until such a system is established every one here can see how easily frauds might be committed, and how many diploma-mills would probably be organized, if self-constituted teachers were sustained by the dental profession in issuing diplomas on their examination alone.

Dr. Taft. The problems connected with the subject of education

in our profession are many and difficult. It would be desirable to have the requirements for entrance into our colleges uniform. It would be well to have a common curriculum that should embrace the proper subjects for an accepted course. Let this be such as could be accepted by all as nearly as possible, then if any desired to extend the curriculum there could be no objection. With uniform requirements for admission, a uniform course of instruction, and uniform requirements for graduation, some of the evils at least that now attend our educational system would be greatly lessened, and perhaps removed altogether. How the concurrence of the various dental colleges could be secured for such a purpose it is not easy to determine. There was, some fifteen years ago, an association formed of the faculties of the various dental colleges in this country, and for a time it seemed to promise much for the future, but jealousies and antagonisms sprang up,—or rather existed from the first, and were permitted to grow till open rupture occurred,—and the withdrawal of two or three of the colleges resulted, while others became discouraged, and the enterprise failed. But enough was done to demonstrate that by proper co-operation great good would have been accomplished, had the organization been maintained. Is not the time at hand when this can be done? Has not this body power and influence enough to aid and give encouragement to such an organization?

There has been for several years an association of the faculties of medical colleges, and great good has been accomplished by it. The American Medical Association encourages and fosters the association of college faculties. It has been suggested that the cause of dental education would be promoted by the examination of candidates for graduation by a board outside of and not connected with the colleges, and that the decision of such board should be final as to the fitness of the candidate. Experiments of this kind have been made in some instances, but never with any great degree of success. They have generally failed to learn the true standing of students, and in some instances have passed students who ought not to have passed, and occasionally have kept back those who were well qualified.

Without doubt one of the most important steps in this matter would be the organization and maintenance of an association of dental college faculties by which such regulations might be made as would result in some advance in the near future, and ultimately in great progress. For this at least let us work.

Dr. Allport. While no one can appreciate more fully than I do the great benefits which we have derived from dental colleges, in my judgment, they have nearly served their purpose, and we now need something different and better—namely, a fuller and more complete

medical education on the part of dentists than is now afforded in these colleges; and I may add that medical graduates need a better education than is now afforded in our medical colleges.

As reference has been made to the movement contemplated in Chicago, I think it will be well to state just what has been done, as well as what is also proposed. On several occasions during the past few years, professors in two or three of our medical colleges have discussed the idea of establishing dental departments or colleges in connection with their respective schools, but believing that we have already dental colleges enough, the project has been opposed by nearly all of our best dentists. Less than a year ago, the idea was again revived by one of these leading schools, and I, with other dentists, was asked to join in the undertaking. Feeling, as I have just stated, that dentists need a better medical education, and that physicians need a better dental education than is now afforded in their respective schools, I suggested the advisability of establishing chairs on dental diseases in all our medical colleges, irrespective of pathies, and of exacting of all their graduates the same degree of knowledge in regard to dental diseases and the science of their treatment, as is exacted in regard to any and all other diseases, and that all students, no matter whether they intend to engage in the general practice of medicine, or to pay their special attention to skin diseases, general surgery, or dental surgery, should matriculate as medical students, and when qualified, graduate as doctors of medicine.

It will be seen that the establishment of these chairs, so far as practical dentistry is concerned, means nothing; for quite as good, or even better dental instruction for the practice of dental surgery could be secured in any of our dental colleges; the object in this case being to impart to the general practitioner such knowledge in regard to dental diseases and what constitutes good dental treatment, as is not given in any of our medical colleges. In this way they will be better able to judge of the necessary qualifications of a good dentist than they now are, so that they may wisely select those whose medical education is such as to make them wise counselors as to dental complications and their treatment. We all know that in the present state of dental knowledge on the part of physicians, they are quite as apt to call in consultation the worst tooth-carpenters we have as they are to call our best-educated dentists. With them, a dentist means a man who can extract or fill teeth and put in artificial teeth, without regard to medical knowledge; and often our biggest dental quacks are regarded quite as highly by the family physician as are those whom we would regard as qualified to diagnose and treat the various diseases directly or remotely connected with the teeth. In treating the eye or other organs of the body, the regular practi-

tioner hesitates to consult with, or to recommend his patient to any but regular graduates of medicine who make the treatment of any particular class of disease a specialty; but in dental diseases, almost anybody will answer.

By so educating physicians that they will see the importance of a medical education in order to intelligently treat dental diseases, it is hoped that they will exact the same degree of medical knowledge on the part of the dental surgeon that they now exact on the part of the ophthalmologist. Could all of our medical colleges be induced to establish these chairs so that their future graduates would be properly educated, their influence would be so great in regard to this matter, that in a few years the dental surgeon would be forced to become a fully-educated medical man.

For manipulative training, and the application of medical science in the treatment of dental diseases, I suggested the establishing of a dental infirmary, which should be open to the students and graduates of all medical schools upon an equal footing, irrespective of pathies. In this infirmary I suggested that there should be such didactic teaching as would be essential to the medically-educated man in the treatment of dental diseases, together with such digital training as would make them skillful manipulators. By the establishment of dental chairs in our medical colleges, the dental and general education of their graduates would be so complete that but little more than manipulative dental training would be necessary in this infirmary in order to qualify young men to become intelligent and skillful dental surgeons. For this teaching I suggested the establishing of a corps of clinical teachers, selected from our very best practitioners, so that students could have the advantage of the best manipulative training possible, and upon the same footing as the medical graduate who purposes to enter upon the practice of any other department of medicine, (and who receives instruction in hospitals and infirmaries devoted to surgery, gynecology, and ophthalmology, from the most experienced and skilled in those departments). When these dental students had become qualified to enter upon the practice of dental surgery as a specialty in medicine, they should receive certificates of such qualification from the officers in charge of the infirmary. This proposition met with the approval of all present. Although sanguine, myself, as to the advisability of this method of teaching, I presumed it would be opposed by the faculties of our medical colleges; judge then, of my surprise, when not a single teacher belonging to our seven medical colleges in Chicago opposed the idea, and six out of the seven colleges have already established either lectureships or professorships in regard to dental pathology and surgery, and I am assured that the seventh will do it as soon as

the place can be properly filled. The dental infirmary is not yet organized, but it is hoped that it will be before the close of the coming sessions of our medical colleges. This is, in few words, about the status of the undertaking spoken of in the report.

Dr. Buckingham. If we could all agree upon what should be taught to students, we should have no difficulty, but while we have no such agreement, we must have these various modes of instruction. It does look to me to be the most sensible mode of teaching to teach a man what he is to practice. To teach him some branch as a mere ornament to his profession does not appear to me to be desirable. I admit there is a variation in our teaching. There will and must be while there are various colleges. If we were under a general government like that of England or Prussia, we could have a uniform system, and could demand that no man should practice a profession unless he had passed through one of the State institutions, but we have about one hundred and fifty medical colleges, all over the country. Every little town and village has a medical college of some kind or other. A college is like every other institution; it must live, and in order to live it must have students, and when you set the standard so high that the students will not come there, the professors will not work, for they cannot without some compensation. It is glory probably for the first year, but glory does not feed a man long, and without a paying patronage you will find your professors sliding out one after another until the institution gets into the hands of parties who will run it for their own interests. I could point you to two colleges particularly where this has occurred, one of which stood high. The charge that good men will take students merely to get their money is not true.

Dr. Morgan. To propose to educate men and to graduate them on the ground of the time they shall have been engaged in study is a snare and a delusion. I would ask gentlemen who are advancing that idea, if they have ever met any man that they thought would be too well qualified to practice dentistry after having taken the full course of lectures? Is the time going to hurt them? Is there any injury done them? Are any of their rights trampled upon? None whatever. They have no right in college until they enter there, and when they enter they tacitly agree to abide by the laws of the college. There is no wrong to any one because they are entitled to remain two years or five years. The charge that men have graduated because they have attended two full courses, without regard to their qualifications is, I believe, a slander. Some men get through that are not thoroughly qualified, and they may want instruction in many things, but the guiding principle of men who are honest in their profession and who desire to do well by their students

does not sanction such a course. With reference to an examining board outside of the institution, I think no man is so capable of examining a student as the man who has taught him. No man can ascertain so nearly his qualifications as the man who has been through the infirmary and laboratory with him, who has lectured him time and again, and examined him from day to day upon subjects which he has been taught. I know men who, when they come before the faculty with whom they are well acquainted, are sometimes so abashed and embarrassed that it is impossible to get a respectable examination out of them. I examined a student not long ago who had taken his M.D., who had been through an excellent medical institution, and he could scarcely answer half of a dozen questions in anatomy, such was his embarrassment. Are you going to increase that embarrassment and thereby do him an injustice by placing him before a board of examiners with whom he has no acquaintance, and who have no knowledge of his ability or capacity? You cannot bring in a board of examiners who can look at a man and tell what his capacity is; you must know him, you must have intercourse with him, you must understand his character and his mode of thought before you can judge of the extent of his qualifications, and I contend that for that reason it would be unjust and wrong, a stumbling-block to the profession, to adopt such a system of examination. We ought to have some standard of qualification established. There ought to be some unity of action between the different dental faculties in this country by which we could fix some standard. Some of the southern States have passed laws requiring every man to have a license before entering practice. Such laws have been passed in Alabama and Georgia; so that if a man comes from Harvard University with his diploma, he has to go before the board to get his license, and if they see fit, they have a right to go behind his diploma and examine him, and to deny him the privilege of practicing dentistry, if they see he is not qualified. It gives them an opportunity to discriminate between colleges which are honest in what they are doing and those which are not. I am glad of it. The scheme of having chairs in medical colleges for the purpose of teaching the institutes of dentistry is another delusion. It has never been adopted in a single case where it has not proved a curse. Take the experience of the gentlemen who have taught in the State of Iowa, where they had a chair in a medical college that was always filled by men of talent and high qualifications, and the experience of every one of the professors who have occupied that chair is such that they are opposed in toto to such an arrangement. They found that the poor medical students, those of little qualifications, when they went out into the country to practice, would send into the depôts and buy a little kit of tools and

stick them in one end of their saddle-bags, and then they would go around pulling teeth here and stuffing teeth there with amalgam, and bringing disgrace upon the dental profession. I have had an opportunity to observe this thing in another school. If they are taught a little dentistry they go out to practice, and if they fail in practicing medicine they turn around and practice dentistry. I dread the day when our Chicago friends adopt any such system. It will prove a curse, and the oldest man among them will scarcely get out of the world before seeing the evil that has been brought upon the profession. I know where three or four students were required to pass a preliminary examination, and where they could not come up to the standard, they marched right out and went to a neighboring college and wrote their names upon a register and entered, and some of them graduated the first year without attending one full course. That sort of thing is going on in this country, and my impression is that the less association you have between the medical profession and the dental profession in teaching, the better it will be, except as a foundation to build a dental education on. Some gentlemen say they want a broad education. I have no objection. Make it as broad as you please, and the course as long as you please, but qualify men to practice dentistry in a dental college taught by dental men—men who understand what they are teaching, and what they are teaching it for. Tell me a man is qualified to teach an individual science that he has to apply in a certain direction, who knows nothing about the application that is to be made of it? He must know something of the application of the science which he is teaching for a special purpose, or the student who comes out and attempts to apply it for that purpose will fall very far short. It is so in the very nature of the case. The motive which underlies this idea of connecting our dental and medical teachings, of qualifying men to go out from medical colleges with an M.D., for the purpose of practicing dentistry, is because they have a sort of notion that M.D. indicates a higher education, that it is a little more honorable, that it takes them into a higher class of associations. Is that true? I think not. I think the history of the medical profession in this country, with all its "isms" and heresies set up here and there, ought to be enough to deter any man who proposes to practice dentistry from going into it at all. He ought to go elsewhere to qualify himself. Would an M.D. be any evidence whatever? Take an M.D. of the present day—go down into your city—select the most prominent one there, a man who is known throughout the community as an M.D., and who is worthy of the degree; how much evidence is it to me that he is qualified to practice dentistry. Whenever you make that the sine quâ non, so that every man who goes into dentistry must be an

M.D., without any title to show that he has studied dentistry, you open the door to every quack doctor in the land to march in with his kit of tools and proclaim himself a dentist, and there is no man to say whether he is or is not. You open the door and invite into the dental profession all that class who are failures in the practice of medicine, without any evidence of their qualifications, and without the knowledge that they have been to a place where they could qualify themselves to practice. I do not think the profession are ready for that sort of move, and I am confident that if they take it, it will work serious ill consequences to them.

Dr. Brophy. We have heard for a number of years arguments similar to those which have been brought forward by Dr. Morgan, and we have also heard arguments which have caused us to feel that physicians should know something of the diseases of the teeth. Those who enter upon the general practice of medicine, if they are as familiar with the diseases of the teeth as they are with the diseases of the eye and ear, will be more intelligently prepared to diagnose those cases and send them to men of intelligence who can properly treat them. In the city of Chicago I met a young man, only last week, who had received a thorough medical education in one of the schools from which he graduated. He had graduated from the literary department of Yale College, from Rush Medical College, from Bellevue Hospital Medical College, had been a student three years in Vienna; and that man did not know the difference between an educated and intelligent dentist and the most consummate quack in our city to whom he was sending some of his best patients. Why? Because there was in the college in which he had received his education the lack of teaching which he should have had. Would Dr. Morgan charge the physician who has not had the opportunity of studying diseases of the eye and ear with ignorance, because he has not had such opportunities, or would he lay the fault to the institution which has not furnished him with the opportunities? In most of the States they have laws which require that men shall be educated in certain manipulative parts of dentistry, that they shall be able to do certain operations, and they put them to a thorough test. I know our board do. Now, sir, it is impossible with the course that is marked out in Chicago for any of these young physicians to go forth and enter upon the practice of dentistry or the filling of a tooth with the few instruments that they have in one end of their saddle-bags, because the State law will not permit it. They may go on and practice medicine, but they cannot enter upon the practice of dental operations or the manipulations of dentistry. This absolutely and completely precludes any quackery from the medical men who have been trained in dental manipulation or in dental sur-

gery. Dentistry is not confined to the simple filling of a tooth and the construction of artificial teeth. It embraces for its field of operation a portion of surgery and pathology and all the familiar principles of medicine, and where can these principles be best taught? Can they not be best taught in medical schools by teachers who have spent the best portion of their lives in informing themselves so that they can understand the principles and demonstrate them? Most assuredly. It is not the intention of this movement in Chicago to establish a dental college. It is designed to place dentistry in precisely the same position that is occupied by ophthalmology and other medical specialties. Students receive their education in medical colleges. They have obtained their degree of M.D., provided they are qualified, and after this, if they can pass a satisfactory examination before the board of examiners of the infirmary which is expected to be established, then they are qualified to enter upon the practice of dentistry, but not until then. Furthermore, if they were to commence, our State board would be after them, and they would find themselves in trouble. We want the men who practice medicine to know something about the teeth. It is with them that the care of the teeth of the American citizen rests. They can accomplish more in the prevention of decay of the teeth than all the dentists in America to-day.

Dr. Kulp. As Dr. Morgan alluded to our experiment in Iowa, I wish to explain. Twelve or thirteen years ago, when the medical department of the State University was established, the medical faculty invited us to a place in their school—to a chair on dental science. Dr. Wilson, who is present, and myself, were invited to deliver the lectures. We delivered four lectures each during the session for two years; we failed in accomplishing all that we hoped for in the start, but we, perhaps, did a little more than we intended to, for after a few years we found many of the young M.D.'s who graduated in those two sessions were practicing dentistry all over the State in the country towns. I would at times receive letters from young men asking my advice on some particular subject. I would give them advice, thinking it was some case in which it would be necessary for them to do something for the relief of their patients, but I very soon discovered that these men were practicing dentistry, and in the meantime we had circulars flying all over the State, informing us that the Iowa Dental Manufacturing Company was established, with headquarters in Des Moines,—and they were scattered in every community; we learned that these young M.D.'s were extracting the teeth, while they had their "dental men" taking the impressions and sending the models down to headquarters, who would in time return the plates and they were fitted in by the M.D.'s

We protested very strongly to the medical faculty. We told them we would have nothing further to do with their institution unless they stopped that sort of procedure. They instituted some pretty strenuous measures, and did stop it to some extent. There are a few who are still at it but we have cut them off now in our State law. What I want to emphasize is that our experience with the plan, that started out on the very same principle that these good men from Chicago are starting out with, has been very much against the method. My observation of twelve or fourteen years with that sort of work is, that it will bring a curse upon the dental profession. That is my prophecy, and if it does not prove true you can put me down as no prophet.

Dr. Allport. Dr. Morgan seems to have a very great aversion to prospective practitioners of dentistry having anything to do with medical colleges or medical teachers; now I would like to ask the gentleman one square, honest question: did he not when he decided to educate his own son as a dentist put him into a medical college and graduate him as an M.D. previous to his instruction in a dental college? and does he not advise all young men to follow the same course if they desire to take a front rank as practitioners of dental surgery?

Dr. Morgan. I think a medical education is a first-rate foundation upon which to build a dental education, and I have no objection to it in that form, but a man should have a dental education aside from the medical.

Dr. Allport. One thing more. Our friend Dr. Kulp seems much afraid that medical graduates who know anything about diseases of the teeth, will be tinkering at dentistry around the country, and become dental quacks. Did the doctor ever know bigger quacks than come from some of our dental colleges? We have not in Chicago to-day greater quacks than some of our dental graduates; but this is no argument against dental colleges. You cannot make respectable people of everybody, either with or without an education. It is the individual and not education that makes the quack. The question whether a medical education is essential or not to the intelligent practice of dentistry, is determined by the question, whether dentistry is an independent profession or a specialty in medicine. If the latter, it should take the same course that other specialties do. First lay the foundations broad and deep in the science of medicine, and then build our specialty upon it, the same as the specialties in law are built upon the great and fundamental principles of justice as laid down in the comprehensive teachings of such jurists and pleaders as Blackstone, Coke, and Chitty. The idea of undertaking to build up an independent profession (as some claim that

dentistry is) out of a segment of a profession, is nonsense; we have been at it long enough; let us go to work and lay our foundations deep and broad in the science of medicine, and then we shall have something upon which to build an intelligent practice. If the science of medicine forms a basis upon which all diseases are treated, it would be as consistent to undertake to build up a distinct profession in the practice of criminal law, or admiralty or commercial law, without a knowledge of the principles of general law, as to undertake to build up a separate profession out of the treatment of any particular class of diseases, when a general knowledge of medicine is essential at every step in the treatment. A knowledge of anatomy and pathology is requisite in the treatment of all classes of disease, and this knowledge must be acquired from medical textbooks, which discuss the principles underlying the general practice of medicine; and it is from these books that we get all the knowledge we have of general principles. It is upon these principles that all medical teachings in our dental colleges are based, as well as all books that relate to our special practice. And to pretend that dental surgery is an independent profession when not an intelligent step can be taken in its practice without medical knowledge in simply absurd, Without this medical knowledge it is not a profession—it is a trade; and it is a specialty in medicine just in proportion as the practitioner is medically educated. When dental education is established upon these principles we shall have genuine dental surgeons, but until then we shall not.

Dr. E. Hunter. If it is a fact, as gentlemen, say, that the greatest quacks that are in the dental profession (and it will not be denied) are graduates of colleges, it seems to me very evident that some other than an educational standard should be adopted for admitting candidates into our offices as well as colleges. Adaptability for any employment or profession, it seems to me, should be the requirement for entering upon a life-work. Time is too precious to be thrown away on any special employment where nature has refused a special liberal endowment in that direction. To encourage a young person to enter the dental profession without good natural abilities for that, including sterling integrity, is to blight his life-work, when in some proper sphere he could be a blessing to himself and humanity. There should be no guess-work about so important a matter as that. Let no young man be encouraged to make an attempt that will only end in his being denounced as charlatan, empiric, and quack. A man must be born a dentist to ever become proficient as such. The capacity for becoming a dentist, physician, mathematician, or orator, can never be bought with money or attained by a college course of any number of years. Open the professional doors to none who

have not the capacity for the specialty, and the problem of dental education will be easily and speedily solved.

Dr. Buckingham. It appears remarkably strange to me that the dentists are not competent to teach dentistry—that all these men who are talking here do not know enough of physiology, anatomy, and medicine to teach dentistry.

Dr. Morgan. With regard to the breadth of education. What is the reason you cannot educate a man well and thoroughly in a dental college? Why cannot you provide for teaching anatomy, physiology and chemistry? In the institution with which I am connected these branches are provided for. Why do you want to run after medical men who are directing their teaching in another line? Why not teach it in your own particular line? It was said here that I had said something disrespectful of the medical profession. I did not do any such thing. I said that the most distinguished medical man in this city was not able to practice dentistry, and he will tell you exactly the same thing, and he would not consider it disrespectful if I should say to him, you do not know how to teach it. But there are gentlemen here who do speak disrespectfully of the profession, in saying they do not know enough to teach the students who go into their institution what they ought to know, that they ought to teach them everything about dental diseases but cannot. You are the gentlemen who are disparaging the medical profession, while I hold them up as honorable men, especially those who are doctors of medicine in truth.

Dr. Robinson. I want to say, that while I fully agree with Dr. Allport, that a medical man should be a good dentist,—and I have had large experience,—I never have known one man who was a doctor of medicine and a dentist to be the very best without he was a dentist first before he was a doctor of medicine.

Dr. L. G. Noel, Nashville, offered the following resolution, which was referred to the Section on Dental Education for action at the next annual session.

Resolved, That this Association recommends to the various dental colleges of this country the organization of an association of colleges for the purpose of securing concerted action as to what shall be required of students, both upon entering and leaving those institutions; and that in case such an association is formed, no college refusing to abide by the action of the College Association shall be recognized by the American Dental Association.

Adjourned to meet in Niagara Falls, Tuesday, August 7, 1883.

The formula for the solder alloy presented by Dr. Dorrance at the morning session, is as follows:

1 part pure silver;
2 parts " zinc;
3 " " copper.

The copper and silver are melted without flux in a clean crucible which is well lined with borax; the zinc is then added in small quantities as rapidly as may be without chilling the molten mass so that it loses its fluidity, meanwhile stirring it with a clay pipe-stem or rod, or a white-wood stick, until the profuse fumes of the burning zinc just pass off, when pour immediately into an ingot mold, or into clean water in a clean wooden pail. The best results are obtained when the alloy is made in quantity, and by one skilled in manipulation; but even when made in small amounts and with ordinary care, this alloy will, after trial, be found indispensable, as by its use the trouble and uncertainty usually attending the making of solder from the formulas of the books are done away with, and even ordinary skill will serve to secure fine results. While an easy flowing solder may be made with this alloy in which commercial (*i.e.*, impure) copper and zinc are used, the resulting solder—as in the case of solder made more fusible by the addition of ordinary brass—will be more or less brittle. Therefore, it is insisted that the metals entering into the composition of this alloy be absolutely pure, especially free from arsenic, antimony, cadmium, etc., and not only the alloy, but also the gold or silver solders made with the use of it, will be tough and easy-flowing. Inasmuch as the zinc has not been protected from oxidation, if it has been cast at the proper moment, it will be found present in about its combining weight.

Now, this "solder alloy" may be used in its present state as a solder for brass, copper, steel, or iron, as it will be found to flow readily,—much more so than any of the spelters,—and it makes a strong joint. It may be used in the place of anything else: with gold, either pure, coin, or plate scraps of any carat, in making a carat solder, or a per-cent. solder; and it will be found to follow the color of the gold used, unless an excess of alloy is added, or rather, a low grade solder is made. With silver for a silver solder, the resulting alloy is white unless used in excess. Both gold and silver solders made with this alloy will be found very tough and easy-flowing, the range of proportion most desirable being, for gold solder, from 20 to 12 carats, or from 15 to 50 per cent. of alloy (the 12-carat or 50-per-cent.-solder being too coarse for the run of dental work), and for silver solder from one to four or even six parts of pure silver to one part of alloy—two to four parts silver to one of alloy, being the more useful proportions. In reply to a question as to what proportion to use as a solder for a crown of coin gold, so that the color would approach that of the gold, Dr. Dorrance advised that 10 to 15 per cent. of the alloy be added to the coin scraps, or sufficient to make a 19-carat solder.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

A stated meeting of the Odontographic Society of Pennsylvania was held November 1, 1882, the President, Dr. Faught, in the chair.

The president opened for discussion the subject of "Pulpitis," more particularly that resulting in the death of the pulp, and the subsequent treatment of the tooth. He said that within each tooth is a body composed of connective tissue, exceedingly delicate in structure, in which ramify nerves, arteries, and veins; any undue congestion of this structure quickly gives us the symptoms of inflammation. Pulpitis is a condition we are daily called upon to treat and guard against. We recognize in it the foundation of many forms of disease that every hour in our practice try our skill, and we are successful in its treatment just in proportion as we understand it. Pulpitis in deciduous teeth, resulting from an exposed or nearly-exposed pulp, which in these cases is extremely vascular, sends to us our younger patients. What shall we do with such cases? My own practice for some years has been to afford temporary relief, reduce the inflammation, and fill the cavities. The great difficulty in keeping the cavities dry and properly excavating them, on account of the age of the patient, and the insecurity of such fillings at best, have often made me feel the necessity for, and more frequently of late to adopt, a more permanent relief for the present and future trouble—viz., the destruction of the pulp by iodine or chloride of zinc. In older patients pulpitis comes to us resulting from various causes often requiring great discrimination in our mode of treatment. Pulpitis as the result of advanced caries, which permits the wounding of the pulp by external irritants, presents two conditions—that of total exposure, and that of the pulp nearly but not quite exposed. When the first condition exists, I invariably devitalize at once, treat the tooth and fill. For devitalizing purposes I use the prepared fiber, and in all cases for the final dressing of the root cotton saturated with various medicaments, as the case may indicate. Should there be at any future time a tendency to the formation of an abscess in a tooth so treated, I re-dress it with the medicines indicated, to gain relief, and then insert a permanent stopping. Should a fistulous opening have formed, I open the canals, cleanse them and re-dress with cotton saturated with the following mixture:

Glycerinæ, f℥ij.
Acid. Tannic., ʒij.
Morphiæ Acetatis, ʒj.
Iodoform, ℈j.

Having treated the tooth in this manner, I seal permanently and dismiss the patient. The opening invariably heals and the tooth generally takes care of itself without further attention. In partial

exposure, before filling, I make a capping of gutta-percha alone, or of oxychloride of zinc as a cover to a layer of arnicated court-plaster. The latter has often afforded me excellent results. Another great source of pulpitis is mechanical violence, sometimes the result of filling a tooth when it was in an improper condition to receive or tolerate a filling; improper application of the filling-material; too rapid wedging; accidental blows upon the tooth; loss of tooth-structure by attrition, and lastly, the formation of pulp-nodules. A third source of pulpitis is thermal changes, and lastly, I may call attention to constitutional syphilis as an agent in its production.

Dr. J. R. C. Ward had tried capping exposed pulps with gutta-percha and with oxychloride of zinc, but invariably lost the pulp or was compelled to remove the filling. Now, whenever he is called upon to treat a tooth in which the pulp has been exposed for any length of time with evident symptoms of inflammation, he always devitalizes, believing it the surest way of saving the tooth and avoiding further trouble to the patient. When a pulp is accidentally exposed by excavating for a filling, he caps successfully by applying creasote freely, then covering the exposure with gold-beaters' skin, having first applied tincture benzoin around the exposure. Over the gold-beaters' skin is placed a paste of oxide of zinc and creasote; the cavity is then filled with oxychloride or oxyphosphate of zinc. In treating devitalized teeth, he has discarded cotton and gold entirely. He had never used gold, as he did not believe the entire root of a tooth could be filled with it, even when the canals are opened by drilling, which he believes to be a dangerous practice. He never attempted to enlarge canals, except, perhaps, for a short distance from the pulp-chamber, as it was impossible to get drills to follow them. He therefore filled them without changing them in any way, using slow-setting cements, forcing or pumping them to the ends of the canals with very fine broaches. The broaches he used for this purpose he made himself from the jewelers' broaches used for making second-hands for watches. He drew the temper of these to make them pliable, and found that they would follow the canal in any root, except, perhaps, the anterior buccal roots of some superior molars. He had, for several years, treated pulpless teeth in all conditions by this method, and was pleased to report that in only one or two cases was he called upon to treat subsequent troubles therefrom. He fully believed that where devitalized teeth are properly filled, and fluids are excluded from the canals, no after difficulty will arise. He condemned the practice of making tap-holes; had never had one to come under his care that had not been a source of more or less trouble, but after being treated and filled in the manner he advised, the trouble ceased entirely. The

objection had been made to the practice of filling root-canals with cement, that if it became necessary to re-open them in future it could not be done. His answer was that teeth so filled never required to be unstopped. He hoped soon to present before the society statistics to bear out his assertions, showing the number and condition of teeth so treated by him, and the results.

Dr. Breen's experience with deciduous teeth was that when first attacked by caries, it was invariably on the approximal surfaces of the first and second molars. Being so much softer in structure than the permanent teeth, if the disease was not arrested in its first stages it was very difficult to do more than patch them up for a short time. When caries of these teeth has become deep-seated he has frequently been obliged to remove them some time before the eruption of their permanent successors. The difficulty of keeping the cavities dry, and of properly excavating them, makes it troublesome to insert a good filling, and the porous nature of the tooth-structure permits a greater exudation from the tubuli, tending to start a decay around the margins. Where there is no pulp-exposure he invariably fills with amalgam. He does not consider it safe to devitalize with the arsenical paste, and on this account prefers to obtund sensitiveness with creasote and then to cap with oxychloride of zinc; over this he fills with gutta-percha or phosphate. This treatment he finds will often keep them comfortable for a long time; if not he removes them. In pulpitis, with exposure in the permanent teeth, he has had greater success from devitalizing and extirpating than from capping. He instanced the case of a lady whose inferior left lateral and cuspid had been devitalized, and the pulp-canals filled one-third of their depth with cotton and creasote and the balance of the canal and cavity with gold. The operations had been performed over twenty-one years ago and the teeth had been comfortable, and were in good condition up to the present time.

Dr. Eisenbrey had found that in treating pulpitis with full exposure arsenic was the best means. When the exposure is not extensive he resorts to capping with Japanese bibulous paper dipped in carbolic acid, from which the surplus has been absorbed, or with court-plaster. To reduce inflammation of the pulp he uses oil of mustard or extract of Indian-turnip or horse-radish. In regard to gutta-percha, the reason it causes death of the pulp is because of the heat necessary to apply it, and its expansion. He does not use arsenic in deciduous teeth.

Dr. Graves uses sulphate of morphia and oil of cinnamon in the treatment of pulpitis. For devitalizing pulps he uses equal parts, by weight, of arsenious acid and sulphate of morphia, carefully sealed in the cavity with cotton and sandarac varnish. In subse-

quent treatment he removes the pulp and vessels from the canals, then places in each canal a small twist of cotton slightly moistened with glycerin scented with carbolic acid, filling the remainder of the canal and pulp-chamber with gutta-percha. If the tooth has remained comfortable after one month's trial, he then lines the cavity with oxychloride or oxyphosphate of zinc, and fills with gold or amalgam. He believes that pulpless teeth are liable to give trouble at some future time, no matter how thoroughly they are treated.

Dr. Wunderlich had found arsenic to be the best remedy in the treatment of exposed pulps, especially if they have caused much pain. If the exposure is slight and there has been little or no pain, he always endeavors to save the pulp. For capping in such cases he uses writing paper, coated with acetate of morphia, made into a paste with carbolic acid. This application is to be covered with oxyphosphate or oxychloride of zinc, and over this a filling of gold or amalgam can be inserted. Many pulps die in a year or two after capping. After using arsenic he cleanses thoroughly and fills the roots temporarily with cotton saturated with oil of cloves, or carbolic acid and morphia, allowing it to remain eight or ten days. If the tooth is comfortable at the end of this time the permanent root-filling of the same materials is inserted. The cotton is to be packed as far as possible into the pulp-canals, and the bulbous portion filled with cement; the balance of the cavity with gold or amalgam. He condemns the practice of using arsenic for obtunding sensitive dentine, and does not use it to devitalize the pulps of deciduous teeth; but when they are exposed and aching he uses carbolic acid and morphia to allay pain. If the pulp dies he removes it and treats the tooth and fills in the same manner as a permanent tooth. He had treated a deciduous tooth for one of his own children in this manner, which was doing good service at present.

Dr. McCartney had treated with entire success a case of pulpitis from exposure, in a syphilitic subject, using oxide of zinc and acetate of morphia for capping.

EDWARD C. KIRK, *Secretary.*

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, January 7, 1882.

President Dixon in the chair.

An essay was read by Dr. W. G. A. Bonwill upon "Plastic Gold Alloys." *

Dr. Darby. I am sure that none of us feel like criticising disparagingly Dr. Bonwill's efforts to improve the character of amalgams.

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* See DENTAL COSMOS, August, 1882.

I know nothing of his preparations except what he has said about them. If he has made improvements in amalgam he is to be commended, and for one I should not take exception to his course in keeping from the society the secret of his composition. I am in the habit of using Holmes's Star Amalgam No. 2. It gives me good sharp edges and retains its color as well as any I have used. I have long since observed that, when an amalgam filling touches a gold one in the same tooth, the margins of the amalgam filling are always better, although there is great discoloration of the amalgam. Just what chemical change is produced by this union I am unable to state, but so thoroughly am I convinced that it is good practice to let amalgam and gold touch in the same tooth that I do it wherever I can. I do not consider it bad practice to put them in the same cavity, and where the discoloration is not a serious objection I should advocate that treatment for large and difficult cavities.

Dr. Buckingham. Amalgam will do for operative dentistry what rubber has done for mechanical. It will depress it to just as low a level. One dentist wants an amalgam white, another wants it black; and, although experience has shown that it does not shrink, yet it does blacken the teeth most wretchedly. The oxidation of an amalgam may preserve the teeth; but then look at the condition of the mouth! We all like to have things look nice. Ladies wear gold jewelry because it presents a better appearance than if made of inferior metals, and gold looks much better in the mouth than amalgam. The addition of gold to an amalgam will not protect it from discoloration. If used at all, it should be used judiciously.

Dr. James Truman. I am satisfied from my experience in its use that amalgam has valuable qualities. I cannot indorse the broad statement that it discolors to the extent of making the teeth black. It is evident that the cause of this when present arises from bad manipulation. There is great negligence in performing the final work in such fillings, and they are left with scarcely an attempt at finishing. The same carelessness with gold or any other material would result disastrously. With a high finish the retention of secretions at the margins would be avoided. This, in my judgment, is the principal cause of the discoloration complained of. If the same care is taken with this material that we give to gold and it is used judiciously, there need be no fear that the status of the profession will be lowered by its use.

A paper was then read by Dr. H. C. Register on "The Action of and Reaction upon Fillings." He considered the filling of a vitalized tooth as a purely surgical operation, but not so of one devitalized. If the object is merely to fill up a cavity just as it would be done in any hard, inanimate substance, then the operation is purely me-

chanical. But in a live tooth the primary object is the removal of such diseased portions as have passed beyond recuperation, and to afford an artificial protection adapted to the individual tooth-structure. The reaction upon the foreign material introduced results in a secondary tissue compatible with the changed condition of the organ. He argued that dentine has the power of protecting itself after being divested of its enamel, illustrations of which fact may be seen in the mouths of our elderly patients between whose teeth crude separations were made many years ago. The same fact is apparent in cases treated by Dr. Arthur's system of separating. He did not refer to these cases to indorse the practice,—on the contrary, he thinks it very pernicious unless great care and judgment be used—but to call attention to the power of recuperation existing in tooth-tissue which has been deprived of its natural protective covering. Such tissue when denuded will not remain in contact with foreign matter for any great length of time without either a physiological or pathological change taking place. The character of the change will depend upon the individual structure of the tooth, the selection of filling-material, and its adaptation to the dentine wall with or without mechanical injury. Remove from a cavity the diseased portions, consisting chiefly of basis-substance from which the lime-salts have disappeared, fibrils in various stages of inflammation, intersected with fungi, and loaded with bacteria; prepare and fill the cavity. The open-mouthed tubes surrounding the filling—numbered by thousands—contain organic matter liable to inflammatory action, and a nervous reticulum susceptible to the most exquisite pain. That this condition should remain unchanged seemed to the essayist most unreasonable. From the fact that foreign bodies, such as bullets, will under favorable conditions become encysted in muscular tissue, he argued that the same law was at work in restoring exposed dentine to an approximately normal condition by a deposit of secondary material, and that such deposit may be stimulated by the presence and contact of the proper filling. He insisted that to bring about this result the age, temperament, and constitutional condition of the patient, and the character of the tooth-structure, must be observed, and a suitable filling-material for the individual case adopted. A tooth which has reached the stage of perfect calcification can be saved from progressive caries with but trifling labor, because of its inherent ability to resist or overcome local irritation. But at an earlier stage of tooth-life, or later, under peculiar systemic influences, operations, to succeed, must assist nature until she has built up barriers to counteract thermal influences, and must also prevent the admission of decalcifying agents.

Some time ago Dr. D. D. Smith reported some interesting obser-

vations in regard to the combination of gold and tin as a filling-material, supplementing observations of a like character made by Dr. F. P. Abbot, of Berlin. Dr. Register had pursued this practice for more than twelve years, adopting it in the early part of his professional life in order to bring his operations within the means of his rural patients. Noticing, however, that tin would disintegrate in the course of years, he had substituted amalgam, and with unvarying good results. He attributed this uniform success to his observance of several rules: First, never to use cohesive gold until the enamel line is reached, and then only when approaching or on grinding- or incising-surfaces. He makes the combination at the same sitting, unless electing to build out the amalgam in contour, leaving it platformed for a gold finish at a subsequent sitting. The cases which he thought demanded this course of treatment are those in which the cervical margins are likely to retain food débris and mucous secretions. He claimed to have had marked success by such treatment after repeated failures by ordinary methods. In applying the amalgam he makes it as dry as possible, and mallets it into position by light taps, the cavity having been previously slightly dove-tailed; he does not believe in retaining-pits. Soft-gold cylinders are then to be placed in the cavity with their ends projecting as far beyond the desired contour as is necessary in order to make a thoroughly-condensed surface. Care should be taken to keep a cylinder under the point of the instrument, and as the masticating surface is approached the foil can be annealed and made as hard as desired to the full depth of the enamel. He has little doubt that amalgam so treated is impacted not only directly upon but into the tubuli, pushing back the animal matter. The amalgam in conjunction with the gold makes a non-shrinking filling, and retains a perfect edge. He considered that such a filling exerted a therapeutical influence upon tooth-structure, causing a deposit of lime-salts.

Dr. Darby. I fill most pulp-chambers with oxychloride of zinc, and consider it the best material for the purpose. I do not remember to have ever removed a gold filling from a pulp-chamber and root-canal that there was not a disagreeable odor arising from the decomposition of the once living matter contained in the dentinal tubuli. The antiseptic properties of the chloride of zinc when used prevent this, and if the oxychloride is used thin enough the mouths of these tubes are filled with it. No filling of gold would so thoroughly occupy the pulp-chamber and root-canal. It has many advantages over gold and so far as I am aware no disadvantages. I do not remember to have filled a root-canal with gold in eight years.

Dr. Leech. I present a crown of a tooth removed from a child four years old, apparently in good health. It looks like an exfoliated

permanent bicuspid. The teeth adjacent to the point of exfoliation were in a healthy condition. What was the probable cause of its being thrown off?

Dr. Darby. It is a developing bicuspid.

Dr. E. R. Pettit presented a specimen of the perfect union of the central and lateral incisors of the temporary set. The same condition existed on both sides, and the child's sister's teeth were also united in exactly the same manner. The permanent teeth are coming in properly. He also exhibited a model showing the perfect union of the temporary lateral incisor with a supplemental lateral incisor; another showing the presence of four lateral incisors in the mouth of a child two years of age. The two supplemental incisors had come in about fifteen months after the other laterals made their appearance.

A regular meeting of the society was held Saturday evening, June 10, 1882.

President Essig in the chair.

An essay was read by Dr. S. H. Guilford on "Burs in their Relation to Pain." *

Discussions.

Dr. Leech. I do not agree with Dr. Guilford in all he says in his paper. In regard to the difference in height of the cutting blades of a bur, the higher blades will cut out the pieces of dentine the same, if sharp, as the knives in a planing machine, and with as little pain as if they were all of the same height. The progress of course is not so rapid. Lately in excavating large cavities I have been using small corundum wheels, dipping them in water. I can grind almost to the pulp without giving pain. I think the pain inflicted by the use of the steel bur is caused more by the heat from friction than by the irregular height of the blades; a dull bur requires more pressure, which produces more friction, consequently more heat, and thus more pain.

Dr. Guilford. I am undecided whether the same kind of burs will give the same amount of pain if run fast as they would if run slowly.

Dr. Bonwill. If run with great velocity they will produce less pain, than when run slowly.

Dr. Guilford (to Dr. Bonwill). What difference is there in the amount of pain produced by sharply-cut burs and dull ones?

Dr. Bonwill. Sharply-cut burs produce less pain than dull ones, running at the same velocity.

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* This paper was published in the DENTAL COSMOS for October, 1882.

Dr. Perry, of New York. For sharpening burs, I use a disk of photographers' tintype mounted upon a mandrel, using with it diamond powder and oil. With care the blades can be ground to a knife-edge.

AMBLER TEES, D.D.S., *Recording Secretary.*

At a meeting of the Odontological Society of Pennsylvania, held January 6, 1883, a minute with reference to the death of Dr. M. H. Webb, a member of the society, was adopted, expressing appreciation of his character as a man, and of his high attainments in the field to which his energies had been devoted, the personal sorrow of his fellow-members over the loss of a friend, and their sympathy with his family.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

A REGULAR meeting of the First District Dental Society, State of New York, was held November 7, 1882, at 8 P.M.

The president, Dr. A. L. Northrop, in the chair.

Dr. J. Sugden Crapper, of Hanley, England, showed models of a case of dental irregularity, presenting protrusion of the upper incisors, which had been corrected by passing a metal band across the labial faces of the protruding teeth, and connecting it by rubber ligatures with a vulcanite palatal plate. The president extended the society's thanks to Dr. Crapper, for his attendance and exhibition.

Dr. W. D. Tenison. Six months ago a lady came to me, having a right superior lateral dead, much decayed, and discolored. The history of the case was, that the tooth had been filled several times; each filling being followed by an abscess opening in the roof of the mouth. The tooth (a mere shell) I filled with gutta-percha, as an experiment. The next morning she experienced so much pain that I removed the filling. The next evening she showed me an abscess in the roof of the mouth, the protrusion being almost as large as a walnut, and the tooth extremely loose. After the abscess had been opened, she suffered much pain, which an application of aconite and iodine (one part tincture of aconite to two parts of tincture of iodine), quickly removed. After the abscess had been cured, I extracted the tooth, cleaned out the pulp-canal, and filled it with gold upon a lining of oxyphosphate cement. Then taking a pledget of cotton rolled on a broach, I applied to the socket of the tooth the ordinary saturated solution of chloride of zinc which we use in connection with the oxide for our cement. The application was made to the whole surface of the socket twice in succession, the socket being washed out, and a few minutes intervening between each. Then I replaced the filled tooth in the socket and tied it in place with liga-

tures. These were removed in four or five days. No pain or swelling followed the operation. That was about six or seven months ago; and to-day I hear from the patient, that she has not had any trouble with the tooth, that it is firm in its place, and that the color is, in great measure, restored to its former tone. I have treated several cases in the same way, with success.

The president exhibited models of a case in which two bicuspids had been extracted by rubber ligatures left around them after treatment for dental irregularity.

Mr. A. R. S. Foote, agent of the Electro-Dynamic Company, exhibited a new electric motor, equipped for dental purposes, which he described. [See Dental Cosmos, January, 1883, p. 26.]

A recess was taken to inspect the apparatus; after which a discussion upon it followed.

Dr. N. W. Kingsley. In the examination of any new dental apparatus, some prominent points should always be noted. For instance: Will the new-comer perform its work as well as, or better than, other kinds in use for the same purpose? Will it be easier and more convenient of management? What will be its expense in operation? My experience with this machine has not been sufficient to afford me a final answer to these queries; but it has been sufficient for me to say that the apparatus certainly warrants our attention and trial. As to its power, I think there is quite sufficient for any proper uses to which it may be put in our offices. If one says, "it will not do *this*," and another "it will not do *that*," I answer, do we ask or require such things of a dental engine? The point I wish to make with regard to tests of dental apparatus is that such tests shall not be more severe than those we encounter in the mouth. If an apparatus fails to do what is needed of it, we will, properly, discard it. But if it does what we require, yet fails to do more than we require, we should not then conclude it to be valueless. Put a large bur in this engine, and hold it forcibly upon a piece of ivory for ten or fifteen minutes, and if at the end of that time the battery-power declines, do not call the trial a failure,—for it is an unfair test. No such thing will ever be attempted in the mouth. Again, if you *can* stop the engine by firmly grasping a corundum wheel which it is driving, do not therefore conclude that it lacks power,—for it is an unfair test. A foot-engine would be stopped by the same procedure. Again, if it will not work continuously during three or four hours, do not therefore discard it,—for it is an unfair test. We work the foot-engine for at most only a few minutes at any one time; and this battery, as I understand, recovers itself during every little rest, so that its power is practically continuous.

As to convenience in operating, I cannot, so far, recommend it so

strongly. The foot-engine, in spite of one great inherent objection, has become very easy to use, through habit; and an apparatus to supersede it in this particular must be very easily managed. The great objection to the foot-power is the motion communicated to our bodies and hands while driving it. This certainly does not occur with the electric motor exhibited to-night; yet the control of the battery or working-power is, as at present arranged, very inconvenient to me; nor have I, as yet, been able to devise any way to overcome this objection. Still I believe that it is possible and will be done. Also, the motor is suspended, and must be suspended; and I dislike a mass of strings and wires and "rigging" around my chair. But this objection is already largely obviated; and is not, indeed, of very great weight. I think that if the motive-power can be so arranged as to be easily and conveniently regulated from any position around the chair, we shall have a very perfect apparatus, with which much fault cannot be easily or justly found.

As to its expense, I am not in a position as yet to determine that point. For three or four weeks the motor has served me well. What longer use may develop I cannot say.

Dr. Tenison. I understand the cost of running this motor to be about five dollars per year.

Mr. Foote. The liquid will cost about four dollars yearly. Cast-zincs cost ninety cents a set. Rolled zincs, which are more durable, cost one dollar and twenty cents. If kept clean, they will last as long as the liquid.

The following paper on "The Action of Creasote" was then read by Dr. Wm. H. Atkinson.

The following questions were written upon a slip of paper and handed to me with the request that I make a reply to them:

"Why is so powerful an escharotic as creasote applied to an exposed dental pulp?

"How is it that the theory of return of tissue to the medullary condition can explain creasotic action?

"Can it explain such action?

"Should you expect retrograde action of healthy pulp-tissue after a caustic?

"Will unhealthy (congested) pulp-tissue act in the same way?

"State the differences between scar-tissue and coagula of albumen?"

In the attempt to show the principles involved in these questions, I have written what follows.

Anything like an intelligent reply to these queries involves an understanding of the organization of functioning bodies. Every

form of body the origin of which we have traced takes its rise from a cloud-mass of indistinguishable substance,—*i.e.*, a mass, any part of which is like any other part, so far as sensible proof is concerned.

How substance is endowed with capability to take on the various forms of elemental and composite bodies, and whether this capability is able to respond only to impact of organizing energy, or is self-controlling, are questions the correct answers to which will reveal the methods of involution and evolution.

Metamorphism involves simplicity, duplicity, and complicity of change of constitution in bodies.

Classifications of bodies must be apprehended to enable us to define the limits and mergences of these in producing, maintaining, and re-producing the bodies we relegate to the *mineral*, *vegetable*, and *animal* "*Kingdoms*" of the classifiers of natural bodies. Classification is not complete until a common basis or origin for kingdoms shall have been taken into the scheme of production of the individual body of which the classes and divisions of class are composed.

Mineralization, Vegetalization, and Animalization are expressions denoting the act of bodies *becoming* mineral, vegetable, or animal in character of constitution; the types of which must be known, to enable the observer to distinguish them.

It is the invariable habit of inquirers to ask *why* changes observed occur. It will be more profitable to ask *how* they come to pass, which will lead to closer observations of the changes coming within the range of sensuous perception, and teach us that *cause* lies behind perception, and suggest still finer modes of consciousness, aggregations of which constitute defined *perception*.

Intellect and affection (emotion) constitute the mind. They are both involved in every act. But attention usually is given to one or the other aspect or side of the act, thus seemingly separating them as distinct and independent acts; while they are but the *pre*-dominant and *sub*-dominant aspects of mental activity. In the same manner we are in the habit of giving our attention to mass-action, in changes of place or condition of bodies under observation, instead of considering the molecular changes whose aggregation constitutes the perceptible change in visible bodies no less than the imperceptible in visible and invisible bodies, the behavior of which indicates the occult changes to the reasoning faculty of mind.

The factors of nutrient and re-constructive change are the measures of combining power traceable to atoms. These measures are called bonds of affinity, and have been said to vary in number in the different elemental bodies known as atoms. When one bond is engaged in combining, the atom is said to be univalent; when two, bivalent; when three, trivalent; and so on to septivalent. It will be

readily seen that the changes of molecular constitution may be very complicated, when all the bonds belonging to the different atoms necessary to compose albumen are called into play as alternately active and sleeping bonds.

The formula of albumen is set down as C, 53; H, 7.1; N, 15.5; O, 22.1; S, 1.6, thus making a very composite molecule, endowed with an almost unlimited facility of change in combination. When any other atom or molecule holding stronger affinity for any bond in any element in it than is maintained among themselves as now combined in the molecule of albumen, a new combination is set up, The formula of creasote is set down as follows: C, 14; H, 8, and O, 2, making a much less complicated body known as the molecule of creasote, composed of C, H, O, in different combination. The query now arises as to the mode of action of the bonds in the molecule of creasote when it is brought within the sphere of influence of the molecule of albumen.

Does each molecule act upon the others as a single body with the combined strength of all the bonds of its atoms; or do some of the measures of affinity leave their old mates and unite with new ones more to their liking in the molecule? If they do so unite, old molecules must disrupt and new ones form in the change. If carbolate of albumen be correct nomination, then a new body must be formed in which the whole number of bonds enter, and thus disruption of the albumen and creasote will occur, to the extent of the formation of the new molecule of carbolate. In this case we have a pellicle of carbolate inclosing the unchanged albumen belonging to the pulp, or other body holding albumen, thus limiting the extent of the new body.

The next query is as to the character of nutrient activity in the mass of albumen thus protected from outside influence by the pellicle of carbolate. Any pellicle not soluble in an excess of its parent molecules, acts to the mass it protects as a chorion and amnion, protecting the embryonal mass which forms out of the inclosed pabulum, thus laying the foundation of normal nutrition or of reproduction of tissue of the territory.

Analysts do not agree in the number and proportion of elements composing proximate principles, or as they are called proteinaceous bodies. Albumen is one of these, and has been variously formulated. Were it of uniform composition, we might hope to arrive at definiteness as to its behavior in the presence of bodies capable of effecting changes in its constitution, or destroying it as a molecular body. Creasote in full strength has but feeble escharotic power upon it (albumen) in some constitutions, while in others it makes a considerable eschar.

In illustration of this difference of action of a medicament under varying circumstances, I will cite the following case: I had been using eucalyptol in full strength without its manifesting any escharotic power, until it was applied in a case of abscess on the palatal root of a superior molar, caused by excessive tobacco-smoking. I forced eucalyptol through the root into the sac until I saw it ooze out through the fistula in the gum-tissue; and before the patient left the chair there was abundant evidence of coagulation of albumen in the tissues at the opening of the fistula. I queried whether the nicotine from his smoking had not so operated upon the membrane as to leave it in such a low grade of vitality that it became subject to an escharotic effect from so mild an agent as eucalyptol, which has no such action on normal tissue. I certainly attribute its unwonted activity in this case to the lowered condition of the vaso-motor system of nerves by the action of the nicotine in the tobacco smoked by the patient.

In different degrees of attenuation creasote acts as stimulant, tonic, antiseptic, and depurative. In watery albumen it may be so attenuated by reason of solution, in different degrees, in the water present in the thin and poor albumen of flaccid, strumous habits of body as to present us with these three modes of activity. When acting as a stimulant it simply accelerates the normal molecular nutrient changes by its presence, without disruption of the molecules, and hence is evanescent in action. When it enters into the molecular mass, and is itself disrupted as a molecule of creasote, and at the same time necessarily disrupts some of the albuminous or proteinaceous molecular mass, it becomes a tonic, and we then have normal tissue of the part as the result. When retrogressive nutrient change has progressed to the degree of resolving the tissues involved back to the embryonic, or indifferent, or myxomatous corpuscular condition, we have what is known as the first stage of inflammation of the part. Now, if the reversal of nutrient currents that produced the inflammatory process be continued, we will have the formation of pus in the locality. Pus is nothing less than blood, fluid and corpuscular, deprived of the power of building tissues according to the demands of type. Pus is a bland, non-irritating body, and therefore negative to nutrient currents. In case retrogressive change is further induced by any impact of deteriorating energy, we may have disruption of pus, which changes the pus to sanies. Just at this point antiseptics interrupt the retrogressive process, and the sanies and pus may absorb, and the tissues return to a healthy condition. But if adverse impact be continued or repeated after sanies has been produced, the next grade of disruption results in the production of ichor, which is a chemical solution of blood and other tissue, from which the tissues

can never be resurrected. Ichor must be got rid of, or lasting mischief or death will follow. In case of restoration of tissues from the inflammatory process, we have the new structure made up of what is known as scar-tissue. Scar-tissue, like albumen and other animal primates, is of many degrees of nutrient endowment. First-class scar is scarcely distinguishable from original formation. In such bond of union the connective tissue is traversed by nerves and blood-vessels, thus rendering it able to perform so nearly the functions of normal structure as to be indistinguishable from it. Second-class scar-tissue is poorly endowed with vessels and nerves, and is therefore weaker in function than the normal or original tissue. Third-class scar-tissue is made up principally of fibrous connective tissue, poorly supplied with vessels and nerves, or nearly devoid of these, and therefore only capable of a low exercise of the functions of statical tissue—such as sheaths and tendons. There is a condition of tissue which results upon the use of stimulants, (C, H, O), which is a sort of compromise between scar and normal tissue, viz., a deposit of fat of a poor quality, such as seen in beer drinkers and users of other alcoholic beverages. Those who take their liquor "straight," as they say when they drink it without dilution, do not become fat as do those who largely dilute the alcohol, as with sugar and water, and in beer, etc., etc. The alcohol molecules in these cases permeate the whole mass of soft tissues, and stimulate the parts to high functional activity, which prevents the formation of fat by the breaking up of the alcoholic molecule to produce fat. This fact having been often noticed, gave rise to the statement that alcohol was incapable of conversion into tissue at all. The nitrogenous compounds are least stable of organic molecules, and therefore most readily interfered with by the aldehyde group, which is the basis of the alcohols and other carbo-hydrates, which are the supporters of the slow combustion by which nutrient changes are effected.

Discussion.

Dr. F. A. Roy. Will Dr. Atkinson state whether pus is absorbed as pus, or has it to be changed before absorption?

Dr. Atkinson. That depends upon the meaning intended by "absorption." If it is meant that it is taken directly into the blood-vessels, as when it causes septicemia, I answer, yes. If otherwise, then it goes through a process of solution (digestion), and is taken up by the absorbents and becomes appropriated like any proteinaceous body. Pus is good food. It is already almost one of the tissues. It is blood, fluid and corpuscular, deprived of building-power. One degree of further retrogression, and it ceases to be pus and becomes *sanies*. When

the impact of deteriorating energy is carried still further, it becomes *ichor*, yet all these different substances, pus, sanies, ichor, are habitually regarded as one. Surgeons look at these three things, and call them "pus." Pure pabulum is sometimes called pus.

Dr. Dexter. Will Dr. Atkinson state how pus is digested when absorbed.

Dr. Atkinson. The dogs lick it from their sores.

Dr. Dexter. But men do not do so. The doctor stated that it was absorbed in two ways; directly into the blood-vessels, when it causes septicemia; and that it might be appropriated in another way.

Dr. Atkinson. The question involves that of what are the absorbing vessels,—the venous radicals or the lymphatics. Absorption means "drinking up," percolation. In the case of coagula, or of indurated swellings, the fact of specific endosmotic action has been demonstrated in a mass way, though not to sight. A phlegmon, or common boil, becomes an example, in a case where a patient, by being alarmed, or by poulticing, or by violent exercise, has driven the nutrient currents away, and absorption has occurred in place of suppuration. I am unable to tell *how* these changes occur, but from observations in a mass way I am convinced of the fact.

Dr. Dexter. I offer my personal thanks to Dr. Atkinson for the paper he has given us to-night; not alone because of its general importance and value, but also because his answers to the questions stated at its beginning have formulated, so to speak, certain vague and disconnected ideas which have floated through my mind for some time. It has been said that he should be honored who has caused two blades of grass to grow where one grew before. But how much more, then, shall we thank him who directs those processes of thought which give direction to that increased production? Dr. Atkinson has aided me very sensibly in my future use of medicinal drugs, by aiding me to understand the principles of their action. For such aid, practical as well as theoretical, we all, I am sure, are equally grateful.

The secretary moved that he be empowered to provide a letter-box in the dental depot of The S. S. White Dental Manufacturing Company, corner of Broadway and Thirty-second street, New York City, for the purpose of receiving such communications, hints, questions, and other matter for the society's consideration, as might, from any cause, be otherwise lost to it and to the profession. He believed that many questions of practice, or of theory, often agitated the minds of those whom various circumstances, as of professional or social position, timidity, or absence, prevented from obtaining such aid as would be of perhaps vital importance to themselves and their careers. Also,

it was doubtless true that there were many hints in matters of practice which each could give to all, were a proper opportunity offered. The dental societies were, properly viewed, the most powerful of all the dental educational institutions; and every mode which would bring before them any and all matters of professional interest and value should, in his opinion, be embraced. He thought that much good might come of the project he had stated, as well to the society as to many who might have no other,—or, at least, so good,—way of obtaining it. His idea was, to consider the letter-box as a sort of "Hints and Queries" department of the society. Anything deposited in it would be brought before the society, and if meritorious, published in its transactions; thus carrying anything of value so obtained to the whole profession as well as to the inquirer.

The project was approved by the society; and the secretary therefore notifies the profession that questions for answer, hints, cases of interest, methods of practice, accounts of inventions or discoveries, or anything of professional moment, which it may be desired to bring before this society, for answer, notice, or review, may be directed to him, and will receive the society's attention.

James E. Dexter, *Secretary*,
No. 8 East 34th Street,
New York City.

Clinic.

A clinic of the First District Dental Society, State of New York, was held November 7, 1882, at 2 P. M.

Dr. E. Parmly Brown, of Flushing, New York, performed restoration of the posterior portion of a right lower second bicuspid, using his "universal screw-clamp" and depressed rubber-dam, and the electric mallet He described the uses and powers of his dam and clamp as follows:

"The clamp, in connection with the depressed rubber-dam, enables the dentist to isolate a difficult cavity of this kind as readily as more easy ones are ordinarily isolated. The patient is enabled to close the mouth readily, in order to swallow and relieve any sensation of choking, and the usual discomfort incident to the use of the ordinary rubber-dam is thereby avoided. There is no leakage of the dam, no running of the saliva from the mouth, and no ligatures around the teeth. The dam passes over both the first and second bicuspids, being settled perfectly to its place by a flat steel hook. It is depressed to the form of the mouth. The clamp embraces both teeth surrounded by the dam, in such a way as to make them both support the force of the plugger and operation. I have used this clamp

in filling over two hundred cavities at public clinics, without the slightest leakage or accident of any kind. I filled this tooth with No. 4 extra-cohesive gold foil. For polishing I use a strip of muslin in-instead of the ordinary tape, because it is better and cheaper than the latter. Where space will admit, I double the muslin. Where it is scanty, I use the selvage edge."

Mr. E. T. Starr exhibited the new S. S. White engine hand-piece, No. 6. It was much admired by those present.

Dr. T. W. Oliver exhibited a vulcanite artificial denture covered on its palatal aspect with gold electro-plate upon a basis of another metallic substance.

Dr. H. W. F. Büttner demonstrated his method of setting artificial crowns, by making and setting a left upper lateral incisor crown. The operation was performed ab initio, and occupied about two hours. As Dr. Büttner's method will be found fully described and illustrated in the DENTAL COSMOS for January, 1883, its elucidation is omitted.

W. D. TENISON, *Chairman Clinic Com.*

CORRECTION.

DR. J. E. DEXTER,

Secretary of the First District Dental Society.

Dear Sir:—In the proceedings of the society for May 2, 1882, as published in the December Number of the DENTAL COSMOS, I notice that I have been somewhat misrepresented. From the report (pp. 656 to 660) it would appear that my usual practice in exposed pulps is to devitalize the upper part by arsenious acid, to amputate the crown, and preserve the root portion of the pulp. It is true, I have treated quite a number of cases in this manner, and apparently with good results.

I however, stated at the time, that these cases were experiments, and that I could say but little about the action of arsenious acid until I had completed some other experiments. This is also said in my paper, "The Minute Anatomy, Physiology, Pathology, and Therapeutics of the Dental Pulp" (see DENTAL COSMOS, September, 1882, p. 456).

I would respectfully request you to correct said report, and thereby greatly oblige

Yours, truly,

C. F. W. BÖDECKER.

MASSACHUSETTS DENTAL SOCIETY.

THE eighteenth annual meeting of the Massachusetts Dental Society was held in Boston, December 14 and 15, 1882.

The president, Dr. D. B. Ingalls, in the chair.

The following were elected officers for 1883:

Dr. F. Searle, president; Dr. A. B. Jewell, 1st vice-president; Dr. D. M. Clapp, 2d vice-president; Dr. W. E. Page, secretary; Dr. E. Page, treasurer; Dr. R. R. Andrews, librarian; Drs. D. F. Whitten, F. E. Banfield, J. S. Hurlbut, J. F. Adams, Leon Rideout, executive committee.

W. E. Page, *Secretary.*

ALUMNI ASSOCIATION OF THE PHILADELPHIA DENTAL COLLEGE.

The twentieth annual meeting of the Alumni Association of the Philadelphia Dental College will be held in the College Building, 108 N. Tenth Street, on Wednesday, February 28, 1883, at 10 A.M.

L. Ashley Faught, *President.*

EDITORIAL.

DENTAL LEGISLATION IN VERMONT.

The following is the text of "An Act Regulating the Practice of Dentistry in the State of Vermont," passed at the last session of the Legislature:

An act regulating the practice of dentistry.

It is hereby enacted, etc.:

Section 1. There shall be a board of dental examiners. The board shall consist of five dental graduates or practitioners of dentistry to be appointed by the Governor in the month of November, 1882, and in the month of November biennially thereafter. The term of office of members so appointed shall commence on the first day of December following their appointment, and continue for two years, and until their successors are appointed. The Governor shall fill vacancies in the board.

Sec. 2 The board shall meet annually or oftener. Meetings shall be held on the call of three members. Thirty days' notice of each meeting shall be given by mail to each practicing dentist in the State known to the board.

Sec. 3. The board shall at their meetings examine applicants for licenses to practice dentisry, and shall grant a license to each one whom they find qualified, on payment to the board by each person of the sum of five dollars. The board shall grant a license without fee to any person who has received a diploma from any incorporated dental college, and to each person residing and engaged in the practice of dentistry within the State at the time of the passage of this act, on application of such person accompanied by satisfactory proof of the facts which entitle him to such license.

Sec. 4. Any member of the board may, when the board is not in session,

grant a license to practice dentistry to a person whom such member finds on examination to be qualified, on the payment of the sum of two dollars by such person. A license so granted shall be valid until the next meeting of the board, but no longer. Each member shall make a report of licenses so granted by him at the meeting of the board next following the granting of the license. A member shall not grant a license under the provisions of this section to one who has been rejected by the board as unqualified.

SEC. 5. Members of the board shall receive three dollars each a day for time spent in examining applicants and granting licenses, if the fees received from applicants during the biennial term in which such services are rendered shall be sufficient therefor; and at the end of each biennial term the board shall file with the State Auditor a statement of their receipts and disbursements verified by oath, and shall at the same time pay into the State treasury any excess remaining in their hands.

SEC. 6. A person who without a license in force practices dentistry in this State for a compensation or reward, shall be fined not less than twenty-five dollars nor more than one hundred dollars. But no penalty shall attach to a person for merely extracting teeth.

SEC. 7. The board of dental examiners shall keep a book in which they shall cause to be entered the name of each person to whom a license has been issued under the provisions of this act.

SEC. 8. A person receiving a license from the board of dental examiners shall, within thirty days from the time of receiving the same, cause it to be recorded in the office of the Secretary of State, who shall be entitled to twenty-five cents for recording each license.

SEC. 9. A person who does not cause his license to be recorded within the time required by the preceding section shall forfeit the license, and shall not be relicensed until he has paid to the board the sum of ten dollars.

SEC. 10. This act shall take effect from its passage, except SEC. 6, which shall take effect on the first day of January, 1883.

Approved November 29, 1882.

The Board of Censors appointed to carry out the provisions of the law consists of the following: Drs. James Lewis, Burlington; O. P. Forbush, Montpelier; L. T. Lawton, Rutland; R. M. Chase, Bethel, and G. H. Swift, Manchester.

BIBLIOGRAPHICAL.

A PRACTICAL TREATISE ON OPERATIVE DENTISTRY, by J. TAFT, M.D., D.D.S. Fourth edition, revised. Philadelphia: P. Blakiston, Son & Co., 1882. Price, cloth, $4.25; sheep, $5.00.

The fact that a new edition of "Taft's Operative Dentistry" has been called for is proof sufficient that dental works are in demand. This is an encouraging fact, and should stimulate to increased exertions to have the text-books so thoroughly revised that there would be no cause of complaint that these necessary aids to dental study

were defective and had not advanced with the progress made in the profession.

The book under consideration is so thoroughly well known that any elaborate review must be superfluous. The changes made from the third edition in this, the fourth, are very trifling and are principally on the side of condensation, there being thirteen more pages in the former than in the latter.

From the persistence with which the author follows the course chosen years ago, it is evident he entertains a positive conviction that "Operative Dentistry" consists mainly of three things: filling teeth; pulp-exposures, and possible pathological complications, and extraction; for the present work has 346 pages devoted to these subjects out of 468 of original matter. While this definition of operative dentistry might have answered thirty years ago, it certainly does not at the present time, and it is surprising that Dr. Taft does not recognize the fact and so change each successive edition as to bring it more in harmony with the advanced thought and practice of the profession. In the preface of the present edition the author says: "There has seemed no reason for changing the general plan of the work. The aim from the beginning has been to present the subjects embraced in such an order as will best serve the interests of the student, for whom the work is primarily intended."

The opening subject "Deposits" has not been changed, as far as the writer is aware, from the earliest editions. The author still persists in the assertion that green stain has its "origin in the mucus," but upon what grounds is not explained. While its presence on young teeth is almost a certain indication of softened enamel, this is not the case when it is found on mature and very dense teeth. Hence the assertion, that "when of long standing the entire enamel beneath is destroyed," cannot be sustained by the facts, nor the other that the "effect upon the teeth is not produced by the coloring-matter," but "by an acid in combination with this material before it is deposited." The evidence is very conclusive that it is not a "precipitate" from the mucus, as salivary calculus is deposited from the saliva, but is rather a growth upon the surface. Investigations demonstrated years ago that it was a growth of fungi and not a precipitation, but whether this developed its own acid, as in the case of the "sprosspilz" described by Miller, or whether it retained the neutral secretions to the acidulated stage, is an open question. Wedl says that it may "readily be demonstrated that the deposit is a green, green-yellowish, uniformly minutely granular mass *which is morphologically identical with the matrix of leptothrix*." (Italics ours.)

The chapters on caries are not improved, but remain about the same as originally written. Koecker is repeatedly quoted as an au-

thority. While it is certain that truth never grows old, it might be of more value to students to know something of the investigations of recent years rather than those conducted prior to 1828, the date of Koecker's work. Westcott's experiments are given in full, and Watt's views on caries are presented in extenso in the appendix, but the labors of Tomes, Magitot, Leber and Rottenstein, Abbott, Baume, and others, are not even alluded to, and without a résumé of their work no student can hope to intelligently understand the subject.

Under the head of "Materials for Filling," *two and a quarter pages* are devoted to amalgam. In view of the fact that more attention has been devoted to this alloy in recent years than ever before, and that greater improvements have been made in it, it seems surprising that the author should have given so little attention to it. It is very evident he does not believe in amalgam, for one-half of the article is taken up with objections to its use and there is not a line as to its proper introduction. The objections the author urges against it may have great force with him, and it is proper that he should enforce them, but at the same time certain things are required for the instruction of the student, and especially should they be taught the reasons that have led the profession generally to review former positions and also some of the means at present in use that have resulted in making this alloy so valuable that for some purposes it has no superior as a filling-material. The statement that a "tooth filled with this alloy generally becomes blackened and its appearance ruined," is only true in a limited degree, and when it does occur it is more the result of bad manipulation or bad material than because of any intrinsic defect.

Tin receives but little attention at his hands, our author evidently having a decided prejudice against it, and therefore it is quite summarily disposed of. He writes of it "that in an unhealthy mouth, with the secretions in an abnormal condition and the teeth neglected, tin fillings are very rapidly destroyed by the action of the various agents that may come in contact with them." Those who have used tin, and the number is not limited to a few, know that such a broad assertion is absolutely incorrect; indeed, the reverse is true, and the statement might be made to read that in an unhealthy mouth tin is the best material to use, provided the operator knows how to manipulate it. The preservative properties of this metal in the mouth, have come to be so well understood by some of our best operators, that they would on no account discard it from practice. Its value as a lining for gold fillings at the cervical border on approximal surfaces, alone or combined with gold, cannot be overestimated.

Oxychlorides and oxyphosphates are treated in the same indifferent manner, and the student will look in vain for any clear idea of how these materials should be worked for the production of the best results.

The chapters on "Filling" are full, unnecessarily so, it would seem, but this is a good fault, if fault it be. The serious objection to it is that the consideration of every class of cavities results in needless repetitions. If the examination was limited to a few typical cavities there would be more room for equally important matter now wholly neglected.

The chapter on "Pivot-teeth" has had added to it in this edition four and a quarter pages descriptive of the "Richmond crown;" otherwise it is about as it stood in the earlier issues. In view of the fact that greater improvements have been made in the past five years in pivoting and inserting artificial crowns than at any former period, the omissions in this chapter are inexcusable. The immense quantity of the "Bonwill crowns" that have been sold in a comparatively short period shows that they have proved satisfactory to a very large number, and have filled a long felt want. Aside from these there are other plans equally valuable which are omitted.

The balance of the book is made up of chapters on extraction, anesthesia, and an appendix containing the same matter as that in the third edition.

The work, while remarkable for some things contained, is still more so for the absence of others. One would suppose that the treatment of irregularities came peculiarly under the care of the operative dentist, but with the exception of a brief allusion of a page and three-quarters to this subject, there is not a line by which the inquiring student could gain anything. Not a word is thought necessary in regard to many pathological conditions supposed now to come into daily practice. The author may assert that the scope of the work did not comprise them. If so, why draw the line at alveolar abscess and never mention pyorrhea-alveolaris, and why treat the former so minutely and never mention diseases of the antrum, with which it is so intimately connected?

The remarks we have felt called upon to make have been written in no spirit of hypercriticism, but with the kindest of feelings toward the author personally. It is an ungracious task to speak the truth in this case, but it is done with the hope that the author may be induced, before the next revision, to make a work worthy of his name as an educator and one honorable to the profession in which he has so long and so worthily filled a high position.

The make-up of the volume is unexceptionable and in every way sustains the reputation of the publishers.—T.

Elements of Dental Materia Medica and Therapeutics, with Pharmacopœia. By James Stocken, L.D.S., Eng., assisted by Thomas Gaddes, L.D.S., Eng. and Edin. Third Edition. Philadelphia: P. Blakiston, Son & Co., 1882. Price, $2.50.

The first edition of this book was published about five years since. It contained one hundred and forty-seven pages. The present volume has four hundred pages. Some sixty pages are devoted to introductory matter—the consideration of imponderable, hygienic, surgical, and mechanical remedies; classification of medicines; chemical notation; tables of weights, measures, doses, etc. About two hundred pages are given to "Special Pharmacology;" about fifty to a "Dental Pharmacopœia," and the balance of the book to abbreviations of terms used in prescriptions, table of poisons and their antidotes, index of diseases, and a general index to the volume.

That there is need and a demand for a good *dental* materia medica we feel sure. Does the volume before us meet the requirements? We think not, and for the reason that it is not distinctively enough dental. It contains entirely too much matter which has no special significance in dental practice, while many remedies in daily use by the dentists might well have received fuller treatment. It seems like mere "book-making" to incorporate in a *dental* materia medica whole pages devoted to the botany, chemistry, physical character, preparation, physiological effects and therapeutics of aloes, bismuth, ipecacuanha, nux vomica, and other like drugs, without the introduction of a line to indicate their possible relation to dental practice. Such therapeutic teaching as is contained in the following paragraph does not appear to be of value to the dentist as such:

"Actea is also extolled for lumbago and sciatica, and is said to subdue lumbago more effectually than any other remedy. Dr. Ringer says this remedy is especially indicated when the disease is traceable to some previous derangement of the uterus. * * * In croup mercury is a remedy of great value; and Dr. W. Squire observes, 'calomel should be given from the first and repeated frequently in small doses, ($\frac{1}{2}$ to 1 grain, with $\frac{1}{8}$ to $\frac{1}{4}$ of ipecacuanha), interrupted occasionally for the administration of an emetic, etc.' * * * Few remedies are so efficacious as ipecacuanha in checking certain kinds of vomiting, as that resulting from general weakness, the vomiting of pregnacy, whooping-cough, and that of drunkards."

We might point to many more instances of such irrelevancy, which in our judgment seriously mar the book.

It may be urged that the dentist is a man, and may perhaps have a wife for whom the special therapeutic effects of actea are desirable, or a child liable to croup, and that the information about the

proper administration of calomel in that disease would be serviceable; that it is proper he should learn the best remedy for "the vomiting of pregnacy and that of drunkards." But conceding this, we see no reason, if the treatment indicated for lumbago, especially that "traceable to some previous derangement of the uterus," properly belongs to a dental materia medica, why it should not also include the treatment of any or all of the ills to which flesh is heir; why if the vomiting of pregnancy and that of drunkards are not peculiarly dental derangements they should receive mention in a *dental* materia medica. Granted that it is desirable, nay, essential, that the dentist should possess a knowledge of general materia medica and therapeutics, we still maintain that a *dental* materia medica should be limited in its range as indicated by its title. The *scraps* of information about the action of remedies and the indications in disease, with which the so-called "Special Pharmacology" department of his book abounds, are either too many or too few. They should be either eliminated altogether or indefinitely increased. Had they been omitted room would have been left for fuller treatment of dental remedies. For instance, space might have been afforded for a word of condemnation of the use of wood-charcoal as a dentrifice, and the reasons therefor; instead of which we have only this line: "In a finely levigated state it is used as a tooth-powder." Room might also have been found for caution as to the use of Monsel's solution in hemorrhage following tooth-extraction, because of its liability to cause a slough, and consequent secondary hemorrhage.

Not to multiply instances, there is scarcely a single one of the remedies in daily use in dental practice which has received the fullness of treatment which should have been accorded to it in a dental materia medica. In his preface to the first edition the author said: "There are elaborate works on general materia medica and pharmacology, but none having special reference to dentistry." This void he proposed to fill. We wish he had adhered to the object thus indicated, and had made the volume conform more strictly to its title. Notwithstanding these criticisms, we will do the authors the justice of admitting that the volume is the best work of its kind, and that it contains much valuable information to the dentist not elsewhere attainable in any single volume.

Colored Lithographic Diagram of a Longitudinal Section of an Upper Incisor. By Professor Frank Abbott, M.D., New York. Published by special request of the Dental Society of the State of New York. Price, $1.00.

Dr. Abbott has placed the dental profession under obligations by this beautiful illustration of the minute anatomy of a human tooth.

It conveys so much information and is such a clear exposition of the microscopic structure, that it cannot fail to be both attractive and instructive. We know of no other illustration which gives so correct an idea of the histology of a tooth and its relations to contiguous structures. It is 13½ by 9½ inches in size and is printed in six colors.

Nasmyth's membrane, the enamel, dentine, cementum, pulp, periosteum, socket, gum, blood-vessels and nerves of the pulp, the odontblasts and their connection with the nerve-fibers, the distribution of living matter in the dentine and enamel, are clearly shown.

The work shows rare judgment and ability, and the information it presents at a glance will make it of great value to every intelligent student, and the low price at which it is furnished places it within the reach of all.

OBITUARY.

MARSHALL H. WEBB, D.D.S.

DIED, at Lancaster, Pa., January 1, 1882, of cancer of the colon, Dr. Marshall H. Webb, in the thirty-ninth year of his age.

Dr. Webb's death was not unexpected, the fact of his serious illness having been known for months. It was and is, however, a subject of gratitude that, although confined to his bed for the last year, he did not at any time through all his long and tedious illness suffer severe physical pain.

Marshall Hickman Webb was born at Marlborough, Chester Co., Pa., October 28, 1844. After the completion of his elementary education, he became, in 1861, a student of Dr. Frank Hickman's, who was at that time engaged in the practice of dentistry at Coatesville, Pa.,—Prof. Taylor, principal of Chester Valley Academy, assisting him in his general education. He made rapid progress, and showed distinguished ability in both his professional and academical studies. Having completed his term of pupilage with Dr. Hickman, he attended lectures at the Philadelphia Dental College, and graduated from that institution in 1867. Immediately after, he commenced his professional career at Lancaster, Pa.

Dr. Webb's consummate skill in operative dentistry and his thorough knowledge of dental pathology, soon gained for him a very extensive practice, and brought his name prominently before the dental profession. He was a member of the Harris Dental Association of Lancaster County, the Pennsylvania State Dental Society, the American Dental Association, the New York Odontological Society, and the Odontological Society of Pennsylvania. He was a

lecturer on operative dentistry and dental histology in the Dental Department of the University of Pennsylvania. He was honorary member of many dental societies, and was a delegate to the Medical Congress that assembled in London in 1881.

Dr. Webb was not an ordinary man. By his professional brethren he was regarded as one of the brightest, most energetic, and withal most self-sacrificing workers in the dental profession. His ambition was to place operative dentistry upon a higher plane, and to attain this end no sacrifice seemed to him too great. His work was at all times marked with a sincere purpose and an honest conviction.

To the student he was ever ready to lend a helping hand, and no one of his years ever had a greater number of private pupils or more ardent and zealous followers. All of his pupils will recall many acts attesting his interest in their advancement, and will say with one accord that they owe Dr. Webb a debt of gratitude for his unselfish devotion.

As a clinical instructor he stood without a peer, gentle but firm, always ready, even eager to demonstrate practically the ideas which he advocated in published essays from time to time; as a student he was earnest and thorough; as a practitioner conscientious, capaple, and faithful.

He infused life and enthusiasm among his fellows, and was a hearty worker for the success and advancement of the societies of which he was a member. His efforts in anything he undertook were marked with persistent energy, and though not blessed with a strong physical organism, he was, nevertheless, capable of an immense amount of work.

No man toiled harder than Dr. Webb, and probably no one has done so much to elevate the standard of operative dentistry. His operations were faultless in point of execution, and there was an elegance about their finish that was truly fascinating. The skill which he attained gave him a prominence in his profession surpassed by none, and though dying so young he was fairly entitled to rank as one of the most distinguished of American dentists.

Dr. Webb had a love of fun and a fondness for caricature, which he indulged without bitterness or cynicism. His arrows were sharp, were aimed with an honest motive, and always hit the mark. His target was the pretender, and no hand has done more than his in so few years of labor to expose shams in the profession and lift up genuine merit to its rightful place. He has written nothing which will not help to make better dentists and better men. It may not be amiss to add that the last work of Dr. Webb is now passing through the press. The manuscript was prepared during his months of illness, which did not in the least affect his clear intellect. The

dental student or practitioner who has not read Dr. Webb's contributions to dental literature should by all means do so. His beautiful methods will commend themselves to every thoughtful practitioner, and he will learn to value thorough operations and to despise slovenly performances more than ever before.

Of Dr. Webb's home life; of his hospitality; of his relations as husband and father, it need only be said he exemplified everywhere and always the traits of a Christian gentleman. Dear, kind-hearted, good-natured Webb! Who is there to take his place?

Dr. Webb left a widow and three children to mourn his loss, a clientage which will not forget his faithfulness, a social circle to which he was endeared, and a profession which will honor itself in honoring his memory.

H. C. L.

We have laid aside a biographical notice of Dr. Webb in order to admit one prepared by his former pupil and friend, Dr. Longnecker; but the occasion demands something more than a passing tribute to Dr. Webb's disinterested and valuable services to the profession. He gave time and effort without stint to teach all who chose to learn whatever improved methods he had devised, and it is safe to say that all over the country better dentistry is being done to-day in many offices as a result of Dr. Webb's clinics and teaching. A sad side of the case is that, with the feeling that life was before him,—years of labor,—he gave more of his time and strength for the general good than he could afford to; more doubtless than he would have done had he foreseen the early termination of his career. He has left a widow and three children unprovided for. His record is finished and is before the profession. Already, without solicitation, a score of operators have expressed their sense of obligation and their sympathy by generous subscriptions to a testimonial fund. One of these—an operator of note—remarked in subscribing, "If that pays for what I learned of Dr. Webb it was the cheapest tuition I ever received; it is not simply a pleasure to contribute, but under the circumstances a duty. Many beside myself ought to recognize the substantial advantages which will accrue to them as the result of Dr. Webb's instructions, and which will continue as long as they remain in practice."

The editor of the Dental Cosmos has been solicited to act as treasurer, and will gladly receive and acknowledge any subscriptions which may be sent as a token of appreciation of the unselfish work of Dr. Webb and of sympathy with his bereaved family.

HINTS AND QUERIES.

A Severe Case of Neuralgia.—I have a patient (a young man) with neuralgia of the inferior maxillary. He appeared to be suffering most excruciating pain. His teeth were all sound; no salivary deposits; no inflammation of the gums. I could discover no cause for the pain. He had a similar attack last summer, when his lower front teeth became so loose he could have picked them out with his fingers, and his gums so full of ulcers that he could not shut his mouth. Will some one give me a hint as to the cause and the best treatment?—C. S. P.

Tongue-Sucking.—My little boy, four years of age, sucks his tongue while asleep, but at no other time. What can I do to break him of it?—C.

Care of Dental Machinery.—Thankful for the many valuable suggestions in operative and mechanical dentistry which I have received from others through the Dental Cosmos, I feel moved to contribute my mite toward the general enlightenment in a direction in which circumstances have given me some advantages over most of those engaged in the practice of dentistry. An apprenticeship of several months in a well-regulated machine-shop previous to my study of dentistry has been of great value to me, and enabled me to render important service to others. The *machinery* used in dental practice—engines, mechanical and electric; automatic and electric pluggers, hand-pieces, and hydraulic (so-called) chairs—demands care and attention, which few seem properly to appreciate. As a rule dentists do not give the systematic and methodical care to these valuable and delicate machines which manufacturers bestow upon their engines and shafting, and yet expect of them, in spite of their neglect, the same satisfactory performance that they had from them when fresh from the hand of the manufacturer. Every machine, however strong, has parts subject to wear, and which *will* wear much faster than need be unless proper attention is paid to adjustment, oiling, etc. The rule in most manufactories is to suspend work for a few days every six months in order to give the engine, shafting, and large machines a thorough overhauling. Delicate and complicated machinery requires such attention much more frequently. My intercourse with others convinces me that comparatively few dentists take the pains to study the machines on the right performance of which they depend so much. Take, for instance, a dental hand-piece—any one of them, from the simplest to the most complex. It is safe to say that if the dentist will take a little time—it will require but little—to examine it in detail; learn how to take it apart; to clean, oil, and put it together correctly; and then, fully comprehending its construction and the use of every part, give it, say twice a week, reasonable attention, he will find a satisfaction in its use before unknown. In delicate mechanism certain parts will occasionally have to be renewed, but intelligent care will keep it serviceable much longer than if neglected. In dental colleges I have seen marked illustrations of the effects of neglect and abuse, and heard complaints of the frequent breaking of some portion of the dental engine—like the inner shaft or cable—but almost invariably an examination showed that it was the result of inattention. If the cable is kept slightly oiled, (say once a week), and then properly adjusted—that is, given a little play, just enough to allow for the curve of the arm—the liability to breakage will be reduced to a minimum. I have seen the same neglect and same results in private offices.

A dental engine, when wisely used, is such a valuable machine to the dentist that he should be willing to study its construction, and so familiarize himself with

its organization as to be able to "diagnose" the trouble when it fails to perform properly. Generally the "lesion" will be found to be a "thirsty joint." I suppose that most operators give much less care to their engines and hand-pieces than their wives do to their sewing-machines.

The hydraulic chairs, (so-called, although not hydraulic), also need study and attention. There are two varieties of these chairs sold quite extensively, the S. S. White and the Wilkerson. I think both styles are well constructed mechanically, and neither should give much trouble if the organization and construction were properly comprehended by the user. But, as I have said about engines and hand-pieces, very few take the time or trouble to understand them. The chair is perhaps run up to its highest point and allowed to stand so over night; the office attendant sweeps the floor and dusts the furniture the next morning without protecting the working parts of the chair, and the consequence is dirt and grit on surfaces that should be entirely clean. After a few weeks' repetition this daily accumulation aggregates enough to interfere with the smooth working of the machinery, and the chair is condemned in consequence. Even when intelligent and systematic care is given to a chair working on the principle of the Pedal-lever or Wilkerson, it should be thoroughly cleaned and fresh oil supplied every six months, and oftener than this unless the best oil is used. And yet again and again I have heard the admission from parties using one or other of these chairs that they had not cleaned them or renewed the oil for three years—did not even know that it was necessary. That is considerably longer than a watchmaker would be willing to warrant a watch, although its working parts are inclosed in the most tightly-fitting case that can be constructed.

Two or three recent experiences in assisting fellow-practitioners enabled me to arrive at the following conclusions: If the Pedal-lever chair refuses to rise, the fault is likely to be with the small clamps, or "shoes," as they are termed, which bind the upright column; but generally speaking it is not because they are worn out, and need replacing. The trouble will be found to be in the clutching device, which extends out on either side of the cap or loose head of the base, and can be overcome by raising the chair to its full height, removing the nickel-plated cap and the large screws which pass into the clutching device through the cap or loose head, taking out the shoes, throwing up the levers that press against them, thoroughly cleaning all the parts, particularly the joint, and lubricating them with a fine oil. This will occupy about a half hour's time, and will generally remedy the difficulty. If the working parts are very dirty or gummy, coal-oil or benzine will be found useful in cleaning them.

If the difficulty arises from the chair's gradually slipping down after having been raised, the trouble is as likely to be in the small outlet-valve which lets the oil back into the well or tank. It can in most cases be overcome by lifting the entire chair, placing boxes or blocks of wood under each of the feet, removing the screw-plug at the bottom of the well and draining out the oil through the small hole in the lower front portion of the tank, having a vessel beneath sufficiently large to hold the oil—say a half-gallon. When thoroughly drained replace the screw-plug and fill the tank with benzine, putting it in at the upper hole. Raise and lower the chair several times, and let the benzine remain in the tank over night; draw off the benzine in the morning, and replace the oil, or, if it is dirty or gummy, fill with fresh.

If these hints are well received by those employing dental machinery, I shall be glad to give like hints with reference to electric pluggers and engines in a future number.—W. G.

THE

DENTAL COSMOS.

VOL. XXV. PHILADELPHIA, MARCH, 1883. No. 3.

ORIGINAL COMMUNICATIONS.

A DENTAL ANOMALY.

BY S. H. GUILFORD, A.M., D.D.S.,

Professor of Operative Dentistry in the Philadelphia Dental College.

On the 17th of January last, the writer had the pleasure of exhibiting at the Philadelphia Dental College, to the students of the institution and the profession of the city, present by invitation,* a very remarkable man.

Although forty-eight years of age, and in perfect physical health, having never been confined to his bed by sickness a day in his life, he has been edentulous from birth; is totally lacking the sense of smell and almost devoid of the sense of taste; the surface of his body is destitute of the fine hairs that should cover it, and he has never perspired

Peter Wendling, the subject, was born and has lived during most of his life in Mount Nebo, Lebanon County, Pennsylvania, a little village lying a few miles south of the Blue Mountain range that runs through that part of the State. For the past few years he has been a resident of the village of Bismarck, in the same county, situated close to the South Mountain and near the celebrated Cornwall ore hills, where he carries on the trade of cobbling.

His peculiarities, although greatly interfering with his comfort and convenience, have never in any way affected his health, and intellectually he is as bright as any one in the same condition and circumstances of life.

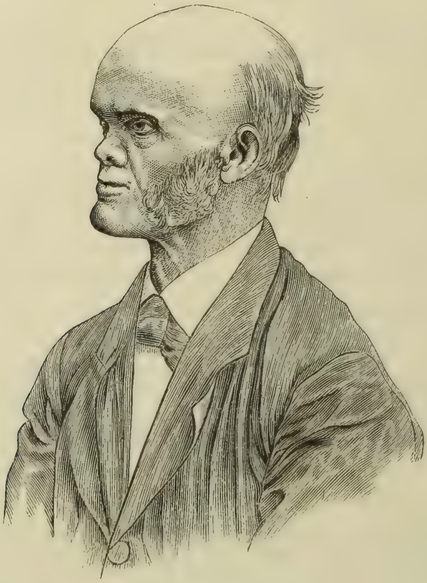
An examination of his jaws shows no peculiar condition of the parts that would not be found in the mouth of an old person whose

* In the evening he was exhibited to the members of the Philadelphia County Medical Society at their regular meeting in the hall of the College of Physicians by one of their number, Wm. B. Atkinson, M.D.

teeth had been extracted years before. There is and has been no development of alveolar process, but the maxillary ridges both above and below are normal and well-shaped. The tissues covering the ridges and palate are neither excessively hard nor unusually soft, and would of themselves furnish no indication of the fact that the man had been born edentulous.

The angle of the inferior maxilla, as in very old edentulous people, is very much lessened, causing (in connection with its greater diameter) the lower jaw to pass entirely outside and clear of the superior maxilla on closure of the jaws.

FIG. 1.



That this peculiarity is not more marked in his appearance is due to the fact of his having a very thick and muscular upper lip, made so, no doubt, by the great use it is put to in the seizure of his food.

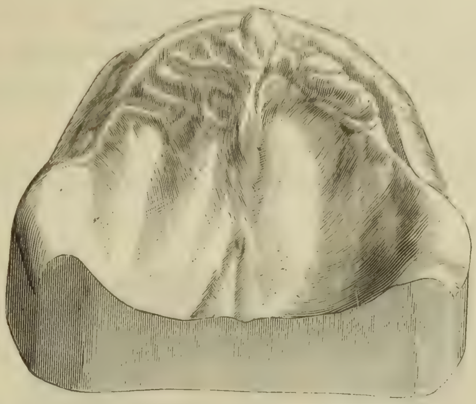
Owing to his jaws approaching each other as they do, they are of no use to him in mastication, this act having to be performed in his case (or a substitute for it) by simply pressing the food against the roof of his mouth with his tongue previous to deglutition. In this way he manages to dispose of meat and all other kinds of food his limited sense of taste enables him to prefer, always cutting it fine before taking it into his mouth.

Totally lacking the power of mastication and thus throwing the greater burden of work upon his stomach, it is a wonder that this organ has so long withstood the strain put upon it; but not until

within the past few years, during which his life has been principally in-doors, has he had any symptoms of indigestion.

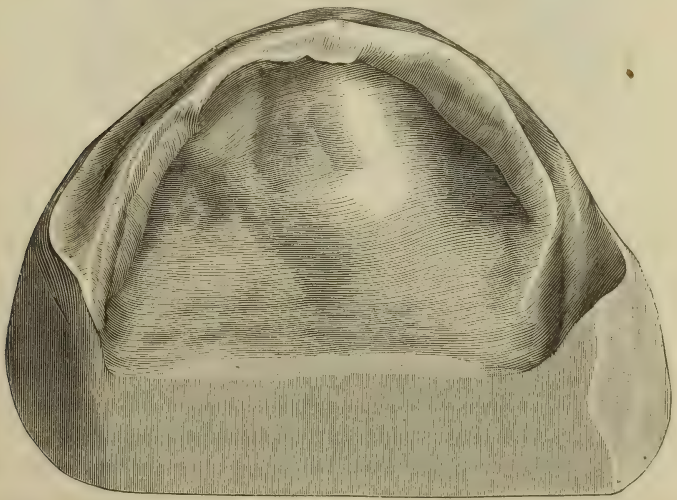
The surface of his body displays one of his most marked characteristics. While he has an abundance of hair on his face as whiskers,

FIG. 2.



and also in the axillary and pubic regions, and his head is sparingly covered with the soft downy growth peculiar to early childhood, the rest of his body is entirely devoid of the fine surface hairs so common to the race.

FIG. 3.

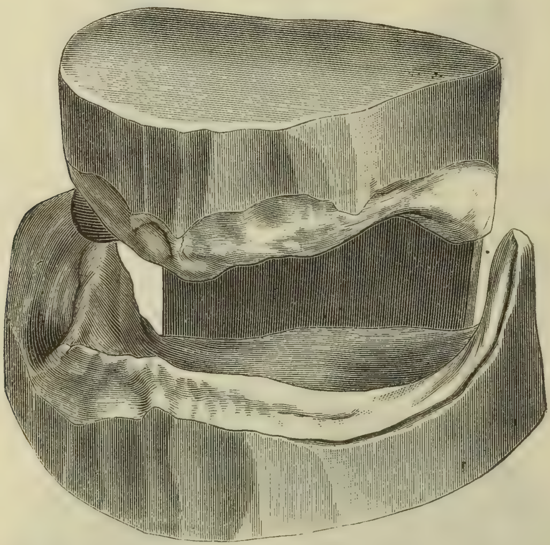


In addition to their absence, there seems to be an absence also of pores in his skin. They must either be lacking or inoperative, as there has never, in his case, been any evidence of a sudoriferous excretion upon the surface of his body.

His skin is always dry, more noticeably so in summer than in winter, and it would be harsh as well were it not for the slight sebaceous humor excreted from the glands beneath. This inability to perspire constitutes, perhaps, the greatest inconvenience of his life, for, there being no perspiration and consequently no evaporation, he is deprived of the means enjoyed by other mortals of thus reducing the temperature of the body in warm weather. To be at all comfortable he is obliged to bring about this evaporation artificially by keeping his clothing continually wet during the warm days of summer.

During boyhood he worked upon his father's farm, and nearly all of his life since he has worked with different farmers as a field-hand

FIG. 4.



during the summer months. Whenever so employed it was also necessary to employ a boy to carry water from some neighboring brook or well to pour over him as soon as his clothing became dry. Whenever there happened to be any delay in the arrival of the water he became weak and would be nearly thrown into a spasm by the suffering caused by the intense internal heat. The writer visited him during one of the hottest days of the past summer, and while every one else was perspiring freely through every pore, this man's skin was quite dry except where covered with his wet clothing.

It has always been his custom of a summer's night, when the heat prevented him from sleeping, to divest himself of all clothing, go into the cool cellar, lie down on the bare ground and take a nap to cool himself off. He would sleep until the temperature of his body

was reduced to a normal and comfortable standard, when he would naturally awake and finish the night in bed. This act, that would have been fatal to another person, never produced any injurious effect upon him in the way of taking cold; for in his case there was no perspiration to be checked.

A few years ago he tried working in the Cornwall iron-ore mines, but the absence of moisture on the palms of his hands prevented him from securely grasping the pick and shovel. He tried the use of gloves in order to give him the necessary amount of friction, but while they helped him, they were inconvenient, and he was eventually obliged to abandon that kind of employment. The lighter tools of his present occupation he is able to handle without difficulty.

The hereditary features of his case are most marked. Mr. W.'s maternal grandmother, a Mrs. Landis, (born Fauber), never had either hair or teeth. Her daughter, the mother of the subject of this sketch, was normal, but she had a brother who was edentulous and hairless from birth Whether either the grandmother or the uncle of Mr. W. were also without the power of perspiring could not be learned. Mr. Wendling's mother was married at the age of sixteen and died at forty, and in that time had given birth to twenty-one children. Some of the births were premature, and several were twins, but eighteen lived to grow up. Mr. W. was not the last of the *series*, but one of the later born. He was the only one who was edentulous, although some of his brothers had never erupted certain of their teeth.

Mr. W. is the father of eight children, some of whom, at least, have inherited to a limited degree the father's edentulous condition, though perfectly normal in every other respect. An examination of the mouths of his two youngest children, girls, aged respectively fourteen and sixteen, showed the absence of many of their teeth. All the canine teeth were present, but in each case there was but one incisor (lateral) where there should have been four; of the bicuspids and molars many were lacking. In the older girl's mouth there were only fourteen teeth, where, at her age, there should have been twenty-eight. Singular as are the statements in regard to this peculiar case, the writer has taken pains to verify them by careful investigation. Several visits were made not only to Mr. Wendling's present home, but also to his former home and place of his birth. His oldest brother furnished many of the facts in regard to their ancestry, and these were again corroborated by a Mr. and Mrs. S———, an elderly couple, life-long residents of Mt. Nebo, who had not only known our subject from the day of his birth, but were also well acquainted with his edentulous uncle and grandmother.

The writer's attention was first called to the case some twelve or

fourteen years ago, by Dr. J. H. Mease, of Lebanon, at that time a student in his office. Dr. M. was born and reared in Mt. Nebo, has always known Mr. Wendling, has frequently performed the part of water-bearer to him when he was employed upon the farm of his father, and wrote, years ago, a short description of him and his peculiarities, which was published in the *Dental Times*, of this city. With all his peculiarities combined, his case is probably without a parallel in medical or dental history.

There have been rare cases of congenital absence of hair, two such cases being mentioned in his "Treatise on Diseases of the Skin," by Prof. L. A. Duhring, of this city. The cases were reported by Schede, a German writer, and a notice of them appeared in the *London Medical Record* for 1879 or 1880.

There have also been reported from time to time cases of partial edentulousness, but so far as can be learned there has never as yet been recorded a single well-authenticated case of entire edentulousness both of the temporary and permanent sets of teeth.

Wedl, in his latest work (1872) says: "Cases of absence of all the permanent teeth certainly are very rare." Linderer reported the case of a woman fifty years of age, who never had any teeth. The examination of her mouth, he says, gave no grounds for doubting the truth of her assertion, although her statement was all he had to go upon.

John Tomes, of London, in his work on Dental Surgery, mentions two cases of edentulousness that were reported to him, but which he had never seen. He says that in his own practice he has never met with a person who did not present some indication of second teeth.

Carabelli, also, never observed such a case, and asserts that the entire absence is an improbable though not an impossible occurrence.

Heider, in the course of twenty-three years, never met with an instance of total deficiency.

It was in view of the above statements that the writer decided to present this perfectly well-authenticated case and have it placed upon record.

CALCIFICATION, DECALCIFICATION, ABSORPTION, HYPERTROPHY.

BY C. N. PEIRCE, D.D.S., PHILADELPHIA, PA.

In the admirable paper of Dr. W. D. Miller, of Berlin, published in the January number of the Dental Cosmos, we find on page 2, the following: "A question which continually suggests itself to me in practice, and which I at present will not attempt to answer is,

whether a decalcification in the sense of resorption of the lime-salts may not take place under the influence of external agents through the medium of the dental pulp?" If the essayist means by "external agents" the irritating influence of thermal changes, or of abnormal secretions, the inquiry might be answered in the affirmative without qualification.

In filling any deep-seated cavity with a metallic substance, where the dental pulp is vital and protected by only a thin lamina of dentine, it is naturally expected that the recognition of thermal changes which the patient experiences subsequent to the completion of the operation will gradually subside, and the assumption is that nature has effected this relief by the physiological process of calcification of the tubuli and of the pulp at that point where it was most liable to be stimulated by the sensation it received from the conduction of heat or cold through the metal filling. Secondary dentine, or dentine of repair, thickening the barrier between the living pulp and the filling within the cavity, might be deemed one of the evidences of the recuperative power of the tooth, and one that is expected will invariably follow the operation above described. Does this result absolutely follow, or is there at times a retrograde metamorphic action? Who has not filled teeth, in which at the time of the operation there existed quite a thick lamina of dentine, sufficient for pulp-protection, the tooth remaining for months, or perhaps for years, without causing discomfort to the patient, but which at some subsequent period, gave rise to an intermittent pain, followed in a few weeks by continued suffering, necessitating the removal of the filling (which had remained intact) revealing an undoubted exposure of the pulp? Where pulps have been capped for very slight exposure, and at some subsequent period—near or remote—the capping has been removed to relieve irritation, this retrograde change is manifested in an exposure double or treble its original size.

An experience within the last two years in the treatment of the superior central incisors for a young woman well illustrates this decalcification. Upon their distal surfaces small and superficial cavities had been previously filled, and the teeth had remained without noticeable discomfort for over four years, when without the slightest disturbance in the integrity of the fillings a susceptibility to thermal changes became quite marked, and refused to yield to any topical applications. After some weeks the pain from changes of temperature became less acute, and more typical of neuralgia, radiating from the pulps of these two teeth. At times it was quite unbearable, and only kept in subjection by the daily administration of from ten to twelve grains of quinine, the pain recurring in all its severity as soon as the influence of this therapeutic agent had sub-

sided. The color of the teeth remained undisturbed, there being not the slightest evidence of any effusion from the pulp. The patient becoming anxious for relief, the small fillings were removed, and to the astonishment of the operator the pulps in both teeth were unmistakably exposed and in close proximity to the metal fillings. The teeth were kept under treatment for weeks in the effort to give relief and at the same time save their vitality; but freedom from suffering was only obtained by devitalization and removal of the pulps. A remarkable feature of this case was that the dissolution of the dentine was only in a line with the approximal fillings, the pulp-cavity within the crowns and roots not being larger than normal, except in the directions indicated.

The decalcification and resorption of the dental tissues are not less noticeable on the external surface of the root than in the pulp-cavity. The cementum covered and nourished by the alveolo-dental membrane, is usually increased in quantity by the influence of a stimulant; and this is known as dental exostosis, but in some cases, quite an opposite result is produced. The same stimulant, which under ordinary circumstances would produce a hyper-nutrition, would under dissimilar systemic and probably local conditions induce the decalcification and resorption of a portion or the whole of the root.

Fig. 1.

Fig. 2.

Fig. 1 represents the crown of a permanent central incisor—the root of which had been absorbed. Its mate stood out of line. The effort to bring it into normal position (which was continued for a few weeks) resulted in the absorption of a portion of its root (Fig. 2). Idiosyncrasies in both of these cases doubtless had much to do with the results, yet they illustrate the possibility of a dissolution and resorption of the inorganic part of the tooth, and probably without the presence of any acid.

A very marked illustration of the same phenomena is the physiological action which results in the dissolution and resorption of the roots of the deciduous teeth.

The profession in their appreciation of Dr. Miller's paper will especially value the results of his investigations regarding micro-organisms and their agency in the decay of human teeth. The results of the careful experiments detailed on page 9 seem to be conclusive.

Lepothrix and their products, bacilli and micrococci, have, we learn, an unmistakable antacid reaction, and have no power of themselves to decalcify or otherwise break up the integrity of tooth-tissue. They are consumers of dead matter and of that undergoing disorganization—burning it up, if you please—and protect the teeth against the influence of another fungus whose product and influence is quite the reverse.

That microscopic organisms play an important part in the consumption of disintegrating tissue, is a well recognized fact. That they are persistent followers of decay—ever present, and always lying in wait to pierce the structure of animals and plants waning in vitality—is doubtless true. To discriminate between those that are benign and useful, and those having an aggressive and hurtful influence, is the labor of the microscopist.

That leptothrix threads play a very inconspicuous part in the production or progress of dental caries seems quite patent from the fact that they may be found as prolific in cavities where decay has entirely ceased (provided that therein are particles of food and other débris from which pabulum may be obtained) as in cavities where decay is rapidly progressing. They are also found upon beds or accumulations of tartar on the surfaces of teeth, natural or artificial, where any material may have been lodged in which decomposition is taking place.

Some years since I proved conclusively that these prolific organisms had an alkaline reaction by introducing and cultivating them in acid infusions. As they rapidly multiplied, it was easy to note the change from an acid to a neutral or alkaline condition.

That there are microscopic growths in the mouth which do produce an acid reaction on saccharine, neutral, or alkaline fluids holding organic matter in solution, is confirmed by Dr. Miller's investigations. He says, page 10, "I have met with only one fungus which beyond all doubt has the power of boring directly into sound dentine. This is not, however, a spalt- but a sprosspilz (multiplying by budding). This fungus is often found in the human mouth, and its presence is always associated with an acid reaction of the liquid immediately surrounding it." He says, further, "It appears to generate an acid upon its growing extremity, by means of which it eats its way directly into the substance of the hardest dentine, not into or in the direction of the dentinal tubules, but invariably cutting them at an angle, anywhere between 0 and 90°."

In a paper published in the Dental Cosmos, September, 1875, entitled "Lower Forms of Life Found within the Oral Cavity," is the following description of the little fungus to which Dr. Miller alludes—"This plant is composed of round or oval cells, which present in their interior one or two little corpuscles resembling somewhat an oil-globule. They are propagated with great rapidity when in contact with decomposing substances at a favorable temperature. Their development is by small projecting bodies on the sides of their cells, (gemmation) which, when they attain the size of the parent, originate new germs, and in this way form a row of from three to six elongated cells, never however becoming confluent so as to form

a cylindrical rod or stem. This cryptococcus is so similar to that found in yeast, beer, ale, and sour milk, that it may be considered practically identical, the principal difference noticed being a variation in the size, while in shape, manner of propagation, and apparent globule within, the modifications are but slight. It is developed in the morbid secretions of the mouth, the œsophagus, and the stomach, and is readily detected in the saliva and remnants of food."

This microscopic plant, consisting of rounded or oval globules a few thousandths of a millimeter in diameter, or an organization analogous to it, is an essential part of all fermentations. They all multiply by budding or gemmation in the fermenting mass, at the expense of the organic matter it contains, and in this way the decomposition results in the formation of either lactic, acetic, butyric, succinic, or glyceric acid.

In pursuing microscopical investigations similar to those of which Dr. Miller has so successfully given us the results, great advantage would be gained if we could have a uniform nomenclature. Leptothrix hairs or threads are so thoroughly understood in their appearance, habitat, development, etc., that probably no better term could be suggested than "leptothrix buccalis"—slender hairs in the mouth. The terms adopted by Dr. Miller for the products which he calls bacilli and micrococci—may be very appropriate, yet his illustrations of these organisms resemble so nearly the vibrio of previous experiments, that it is certainly very hard to distinguish between them, and unless it can be shown that their origin, location, pabulum, and movements materially differ, "vibrios" would be the better term, though I am aware that the doctor makes a distinction between them. Dental bacteria, denticola, torula, protococcus dentalis, cryptococcus cerevisiæ are all terms which have been used. The latter means a cell or capsule; torula means a succession of cells united like a chain. The last three terms, together with the sprosspilz of Dr. Miller, are all evidently intended to allude to the organisms multiplying by gemmation or budding, and by fermentation making solutions of organic matter acid which were previously saccharine, alkaline, or neutral. Torula or dental torula would certainly be an appropriate term to represent this organism. Denticola and dental bacteria have evidently been used to represent the round and half-round shapes found in putrefactions. Dental bacteria would probably represent these. When we come down to the borders of inorganic matter, to the beginnings of life, as it were, and with a lens representing a power of one thousand or fifteen hundred linear diameters, and an area the square of that, and these atoms possessing a constant vibrating, quivering motion, it seems almost bordering on the imaginative to attempt to differentiate these cells and distinguish

between them and the disorganized and decomposing tooth-tissue surrounding them. Especially is this the case when we recognize how difficult it is to define the shape of vibrating matter when it is viewed with a lens which from its exalted power necessarily cuts off so large a proportion of the light.

ORIGINAL MODE OF IMPRESSION-TAKING.

BY STEWART J. SPENCE, SAN FRANCISCO, CAL.

In replacing one or more of the six anterior teeth of either arch it is frequently desirable to provide for the retention of the plate by bracing it against the palatal or lingual surfaces of the bicuspids or molars, by the application of "stays" fitted to these surfaces, with just sufficient pressure to retain the denture and not enough to move the teeth.

It is the more desirable to employ this principle of retention in those cases where the surfaces referred to bulge or lean inward, so as to lock the plate in position. But it is precisely in such cases that there arises the difficulty of taking an unbroken and correct impression by the ordinary impression-trays, the remedy for which difficulty is the subject of this article.

The tray, and manner of using it, which I am about to describe, are, I believe, exceedingly well adapted to overcome the difficulties in the cases referred to. Not only do I obtain a correct impression of the teeth at the parts desired, but also an unbroken impression of the palatal arch.

I will first describe the tray, and how I make it; and then my mode of using it. It can readily be made in a few minutes out of an ordinary upper tray, with a pair of shears. I cut away about one inch of the posterior portion of the tray, and thus bring it within the dimension most needed for taking impressions for small partial plates replacing anterior teeth. Next, cut away from each side the flange of the tray, leaving it remaining in front. Then cut through the tray from the center of the posterior palatal part forward to the base of the remaining flange in front, which is left unsevered; this presents two wings, as we may term them. Three objects are gained by dividing the palatal portion of the tray into these two wings: First, the wings can be bent laterally to the width of the arch of each mouth, measuring from bicuspid to bicuspid across the oral cavity. Second, they can be readily bent upward or downward to suit any height of palatal arch. Third, the plaster runs through the space between the wings, and anchors the impression to the tray, so that they sustain the strong force required in removing the impression from the mouth without separating from each other.

The tray being completed we will describe its use. Plaster is mixed with pulverized alum to produce hardness in a short time, and at the same time to prevent the expansion of the plaster. I mix it only moderately thick and do not stir it long, because I have found by experiments that this yields the hardest cast with the least expansion. It is then placed in the mouth, the plaster as a rule not being permitted to extend any further beyond the bicuspids than can be avoided. To insure a correct impression of the higher parts of the roof, when needed, the fingers should be inserted to the back of the tray and the plaster there pressed against the palate. It will readily be seen that by not investing the buccal surfaces of the bicuspids the impression may be more easily withdrawn; but this is but one object for cutting away the side flanges of the cup,—*the main reason for so doing is that the outer cusps of the bicuspids and molars may be exposed so that they may be grasped by the finger.* Therefore, before the plaster has fully hardened, I trim away any of it which may have run over these outer cusps, and then give time for the impression to become very hard. This being done, I place the index finger under the cusps and *forcibly draw these teeth outward from their positions in the arch;* thick rubber dam being wrapped around the finger. This application of force will usually so far move the teeth on which it is employed in twenty or thirty seconds that force may safely be used at the handle of the tray,—this, however, should never be applied until the plaster has set quite hard; for it is a fact, though not generally appreciated, I believe, that pressure made on plaster, even when apparently set, will compress or dislodge its particles similarly, except in degree, to that which is done by pressure on wax or modelling composition: the ease with which a piece of plaster can be crushed between the thumb and finger after it has set sufficiently to break with a sharp fracture is demonstration of this fact. Both hands of the operator should be used to spread the teeth if an assistant is at hand to manipulate the handle of the tray.

Interrupted traction is the best way in which to apply force to the handle; but the motion each way must be very slight, a mere wriggle, not a swaying up and down, or the plaster will be broken in the interdental spaces. The force exerted in thus withdrawing the impression also aids in spreading the teeth if the plaster has been permitted to set sufficiently hard. If when it has been partially withdrawn, the impression be permitted to remain a minute or two, it will be more easily removed at the end of that time, because it has been pressing the teeth in the meantime.

The same tray and mode of use apply to either arch. Of course the surfaces of the teeth should be free from salivary calculus.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting, November, 1882, held at the house of Dr. J. M. Howe.

President, Dr. S. G. Perry, in the chair.

Dr. C. E. Francis. I want to present a sand-paper disk, made of sand-paper, shellacked on one side. They are useful for finishing approximal fillings. Use them just as you would a celluloid or corundum wheel.

Dr. Jarvie. Would you allow them to get wet?

Dr. Francis. Yes, they do better when dry, but the wet don't hurt them. The sand-paper is shellacked four or five times, and the shellac seems to permeate the paper and cause the sand to cling more closely to it.

Dr. Jarvie. Do they last for more than one filling?

Dr. Francis. Yes, but they are very cheap.

Dr. Bödecker. I have used these sand-paper disks for six or eight months, and I find they surpass anything I ever tried before. In preparing the sand-paper for these disks, first use some shellac varnish which is very thin and then that which is a little thicker, and for the last coat use it quite thick. The first coat will thoroughly permeate the paper and that will make the disk last much longer than if you use thick shellac in the first place.

Dr. Kingsley. What is the shellac for?

Dr. Francis. To stiffen the paper.

Dr. F. Y. Clark. If you substitute sandarach for shellac, you will find it will not dissolve in the saliva.

The following paper on "Objections to a Division of Dentistry," was then read by Dr. Jas. G. Palmer, of New Brunswick, N. J.:

The cause of education everywhere demands the attention of those who are desirous of the advancement of mankind, and anything which tends to increase knowledge in any direction, or more widely diffuse it, secures at once the notice of the intelligent and studious.

Much has been said, and is being said and done in the cause of dental education, and many extreme and opposite views are entertained, concerning what is, and what is not, strictly and rightfully, the extent and scope of dental study.

It is a subject which must attract the attention of the dentist who believes in the dignity of his profession, and desires to advance it in any way whatever, and knowing that the gentlemen composing this

society, are desirous of advancing the interests of the dental profession, I do not feel that this subject will be deemed an unimportant one.

Our magazines and publications are full of it, in one form or another, and there is scarcely a dental publication but presents each month something bearing upon this subject, showing that it occupies the mind, and claims the attention of a large number.

There are certain ideas advocated by some of the most ardent and enthusiastic, which if carried out, will, I think, be detrimental to the high standing of dentistry as a profession by itself, worthy of being recognized by other professions.

With the rapid advancement of our profession into the front rank and its upward strides to a higher and more honorable position among the professions, there has come the necessity of radical changes in the methods of dental education.

So marked has been our advancement that the medical profession, which formerly paid but little attention to dental matters in the course of lectures, and laughed at our desire for recognition, now institutes dental departments,—sections on dentistry (now known as "dental and oral surgery"),—and gives more attention to such matters in the course of lectures, and the dental profession has been elated with these concessions by the medical fraternity, and allowed itself to be taken under their patronizing care, and adopted as the *child* of *medicine*, entitling us to be known as specialists in medicine; as witness the invitation this year to attend the American Medical Association Meeting, at St. Paul, Minn., extended to those dentists who were "*medically educated*," and none others.

I have objected to these methods, and to the idea that we as dentists are merely specialists in medicine, on several grounds and on several occasions.

There is one phase of this matter which this brings me to now,—the idea broached by some, of a permanent division of dentistry into two branches, with the intention that *either* branch may be studied and practiced without any knowledge of the other.

There is no question concerning the necessity for more thorough study in dentistry, but the question is, how best to achieve this desired end. The idea of a complete division of dentistry into two separate and distinct branches, to be taught without relation to each other, and under the auspices of medical schools, seems to many to be one way to answer the question. But is it the wisest way? Will it achieve good results, and will it settle the status of the dentist any more definitely than it is now settled?

In the *Ohio State Journal of Dental Science* for June of this year is the report of Dr. W.W. Allport's paper on "The Relation of Dentistry

to Medicine," read at Detroit, March 29, 1882. He acknowledges that it is by no means settled, whether "dentistry is a mechanical pursuit, a profession by itself, or a department of medicine." He goes on to say as follows: "There is no question that the proper practice of dentistry in its two departments, mechanical and operative, has become so complicated, the one with mechanics and art, and the other with mechanics and medical science, that there are few indeed who possess the natural gifts, or could acquire the necessary skill for the proper practice of both in their present advanced scope and relations. Proficiency of attainment in these two dissimilar vocations in the time allotted to their study is utterly impossible. When properly learned and practiced, one should be classed as a mechanical art, the other as a medical specialty." Further on he desires those who represent the latter class to obtain a knowledge of medicine equal to the general practitioner—*to which should be added such training, as would make them skillful manipulators in operations upon the teeth or associate parts.*

This latter requirement—operations upon the natural teeth—is certainly of a mechanical nature, and if the student has no knowledge of the laws of mechanics, be he ever so learned in theory, he fails as an operator, and *where* can he learn the laws of mechanics, as applied to dentistry, or bring out his natural mechanical skill better than in first engaging in the mechanical department, and from this progressing to the operative, if he shows sufficient ability? I have now in mind a dentist of much knowledge—theoretically—who was presumed to be authority on many dental subjects, who utterly failed as an operator, despite his utmost efforts, and who was also but an indifferent workman in the laboratory. Once I knew him to spend five hours endeavoring to fill a large but accessible approximal cavity in a left superior central incisor, and as the gold inserted would loosen and drop out, he would try some other manufacture of gold, until in despair he said he had tried every kind of gold which he could lay his hands on—that the tooth could not be filled with gold, and so he filled it with phosphate of zinc. I say it was an accessible cavity. I saw it filled in less than an hour and a half,—within two months after the first operation—but by another dentist. The gentleman who first attempted it—while his theory may have been good, and while he was successful in treating diseased conditions of the mouth and teeth, in many cases—did not know enough of what Dr. Allport calls the two "dissimilar vocations," to be able to do the mechanical part of operative dentistry properly.

In June of this year, at St. Paul, before the American Medical Association, Dr. Allport read another paper, on the same subject, in which he said that "dental and medical students, should pursue the

same studies, and that the same knowledge should be exacted of each," and following out the idea embodied in the invitation to the meeting of this association, he would fill the chairs on dental subjects, with none but "medically-educated dentists."

Some one has said that dentistry is considered by physicians as a sort of step-child of medicine, or surgery. And those desirous of being recognized by the medical fraternity are willing to follow the lead of those who, with Dr. Allport, would divide dentistry into two separate branches, and carrying one of them—the operative—into the medical college, succeed in gaining the coveted honor of being recognized—*not* as dentists, *but as physicians entitled to practice dentistry.*

How can one be an operator of any skill or degree of success, without being more or less mechanical in his tastes? Necessarily much of his work is purely mechanical. His knowledge of medicine enables him to bring diseased conditions of the mouth under control, and assists him to decide what is best to be done, in any given case. But there his mechanical skill and ability comes in to give proper direction to his efforts. Are not our most successful operators to-day, whether in the mere filling of cavities of decay, or in the correcting of irregularities, or in the treatment of diseased conditions of the mouth, mainly from the ranks of those who have been in the laboratory, and are yet able to perform the mechanical part of dentistry, if need be?

All this idea of a permanent division of the profession into two such branches, seems to me to be but adding to the importance of medicine, while detracting from that of dentistry.

Dentistry, by the efforts of those who have practiced *all* departments, has been brought to such a high standing that medicine is now willing to teach that concerning the diseases of the mouth and teeth which a few years ago was completely ignored, but shall we on that account surrender, and become *children* instead of *step-children* of medicine? Dentistry may or may not be a specialty of medicine—that is a mooted question,—but it does not seem to me to be the province of medicine to assume charge over operative dentistry as a separate and distinct branch.

I think one great trouble is in this, that what we know as oral surgery—the special study and treatment of diseased conditions of the mouth and adjacent parts, other than work directly upon the teeth, has grown to such proportions as to bewilder some. And as he who is known as the operative dentist is naturally made more or less familiar with the diseases of the mouth, oral surgery has become a part of operative dentistry. Perhaps the idea of a division ot dentistry might be well, if oral surgery, and everything pertaining

thereto, should be the portion intrusted to the medical school, while operative as well as mechanical dentistry should still remain in the dental school.

It is claimed that the practitioner must select one department or the other, and practice only that, because it requires so long to become proficient in both, and that "dental surgery will never be elevated to its proper position until its teaching and practice are uncomplicated with mechanical dentistry," and that the practitioner of dentistry must *first* obtain a thorough medical education.

Mr. Tomes, of England, says of this that it would be well if the average student could spend the requisite length of time in study. And here let me say that it does not seem apparent that a much greater length of time would be necessary for a student to be fully qualified to practice either mechanical or operative dentistry, if our dental colleges came up to the standard which many think they ought to, than it would for the same student, discarding mechanical dentistry, to go through a medical course, and then, using Dr. Allport's words, "take such training as would make him a skillful manipulator in operations upon the teeth or associate parts." Which is to say that he must first become a physician; *then* he may become a dentist, if he desires, which is just what many have been asking for this long while.

That our profession has made great advances we know, and undoubtedly an extension of the time of study, and the making of the course of study fuller and more comprehensive would be advisable, as conducive to still further advancement, wherever and whenever practicable. But cannot this be done and the best dental education be obtained in and through a dental school, where both branches shall be taught in the most thorough manner to be desired, and thus preserve our identity as dentists?

When Dr. Harris, years ago, was impressed with the idea and need of more thorough dental education, and when a medical college applied to to establish a chair for that purpose, declined so to do, dental colleges became a necessity. Is it wise now to give them up, and causing the medical schools to enlarge their course of study, let them have all the credit?

Or would it be wiser to increase the usefulness of our dental colleges, by accepting criticism from all quarters, and adding to the course of study all those things deemed good and necessary?

We have among our numbers those who, though *not* graduates of medicine, are yet able to enlighten the minds and understandings of the medical profession in many things pertaining to the mouth and teeth. Notably has this been the case in the field of *histological research*. Cannot those who represent this advanced class of our

profession convey to dental students, just that knowledge which they need, and do it better than any one else?

We know that there exists a great difference of opinion concerning this matter of dental education, and everything relating thereto; and all efforts that may be made, either in dental or medical circles, to advance the interests of our profession, deserve our attention, At the same time it would be wise to look at the matter carefully, before giving any one an opportunity to so change the character of our profession that it should seem dependent upon medicine for its existence, or to so divide and separate it, that that which is the complement of the other, shall be ignored and put aside. The two departments work together for the benefit and advancement of each other, and go to constitute the complete whole.

Discussion.

Dr. C. D. Cook. If I rightly understand the spirit of the paper just read it takes the ground that dentistry or dental surgery is not a specialty of medicine.

In America, since there have been three or four dental colleges in operation, that perhaps has grown to be the opinion among the graduates of those institutions and among the younger members of the profession and those who are practicing dentistry without any diploma or certificate of qualification.

I can remember pretty well when the ablest practitioners in this country and I think in other countries were medical men,—that is, they held diplomas from medical colleges. I think that until these last few years all our best and most honored text-books, without exception, were given us by medical men practicing dentistry. Many of these men had practiced medicine long and well and then turned their attention to dentistry. I may say that the fathers of the dental profession in this country were medical men.

To show the tendency of the feeling which is obtaining more and more a hold among the practicing dentists in this country, we have only to refer to the dental schools that have been established within the last few years. All of them, with possibly one or two exceptions, have been established in connection with a medical school or university, and quite recently some of the more prominent professors in the old Baltimore Dental College resigned from that school and established the dental department of the University of Maryland at Baltimore.

Dr. Bödecker. I am somewhat interested in that subject. Dr. Cook means, I presume, that the best scientists have been practitioners of medicine.

Dr. Cook. The ablest dentists have been medically educated, either at first or after commencing the practice of dentistry.

Dr. Bödecker. As far as scientific knowledge is concerned, I do not think anybody doubts that; but from the practical point of view this certainly is not the case. Look at Austria and, to a certain extent, Germany, where dental students are required to study medicine for three or four years, with only two or three months' practice in the laboratory and operating-room. Have you ever seen a properly-inserted gold filling come from Austria or Germany, unless the operator has been in this country, or was a pupil of an American dentist? I certainly have not. On the other hand, I agree with Dr. Cook that the better medical education we possess besides the manipulative ability the better are we prepared to meet every emergency. I am, as you know, a graduate of the New York College, and have continually kept up my studies, but yet I feel that I would like to know a great deal more. I therefore must admit that an education as obtained in the dental colleges alone is not quite sufficient to a practitioner treating all diseases of the oral cavity.

Dr. Lord. The paper is one of very great interest, and in some respects quite exciting; yet I do not feel altogether qualified to discuss or speak of its merits.

The views expressed accord for the most part with my experience and observation. Very much has been said and written upon the subject of dental education, and about what should constitute a proper course of instruction and training for the dentist, and it may be said with much truth that it is no nearer settled than it was forty years ago. Probably, indeed, the question is more in the dark and unsettled than it was formerly, for the reason that so many are trying to make themselves and others believe that a medical education is the great thing, that if a young man who proposes to learn dentistry only has a medical diploma he is all right—the work is at least half done,—and this is acknowledged by some of the dental schools. Now, very much of this is a delusion and a snare, and is believed in and talked about more for show than for utility. No right-minded person who is capable of judging would think of undervaluing a course in medicine to a practical dentist, but to suppose or believe that it is of the first importance is a great mistake, and sound reasoning and facts will prove it to be such.

The dental art is eminently mechanical and manipulative in its practical application, and it has suffered and is suffering to-day a great deal more from the want of a mechanical education and training than from the want of more medical knowledge. There are innumerable failures in the practice of dentistry to-day, and who will presume to say that it is owing so much to the lack of a medical edu-

cation as to the want of a better knowledge of mechanics, and training in the proper use of tools? Some of our medically-educated men have been good operators—but not all of them, by any means. A medical education will not make a good practical dentist, and those men who have been successful practitioners have not been such because of their medical course. It gave them many advantages, there can be no question, but it was not the thing they relied upon. Some have depended upon their medical attainments to give them respectability and success, and they have utterly failed.

I hope no one will think that I for a moment would depreciate medical studies. They are imperative, to a certain extent, in order to the highest success and usefulness, but a full course is not required. As Mr. John Tomes wisely said, if the dental student has the means, and time will allow, he would advise the full course in medicine; but he strongly protested against depending upon it to take the place, or to be put instead of the special dental training. Some of the leading men in some of the dental schools are urging or advising that dental students take the full course in medicine first, when at the same time they graduate men who have learned—we may say—almost nothing of dentistry from a mechanical or manipulative standpoint.

As to the matter of dentists being recognized by the medical profession, taken as a whole, it is too absurd to receive our attention, and all this talk about it is simply a disposition or desire to build on another man's foundation.

If we were all medically educated we would be known as dentists still, and not as physicians; for as Mr. John Tomes has said, to quote him again, "the public will call us dentists, do what we will, and if we suffer it will not be by the name but by our want of worth."

I can but believe that it was a mistake on the part of those dentists who sought to be admitted as members of the American Medical Association, as it would seem that they were allowed—rather than otherwise—on the part of that highly honorable and scientific body, and that through much concession.

It cannot be the object of the dentists to get instruction from the physicians on dental subjects, for we all know that they have very little knowledge of the teeth, the diseases they are subject to, or the influence or effect of those diseases upon the general system. And how can they be expected to? The whole subject is almost entirely left out of the medical course, and after graduation they give the matter no attention. Then, if the medical fraternity, composing that association, propose by permitting some dentists to become members to get some light upon dentistry, why only admit those who have medical diplomas, when they are not infrequently our poorest

operators, and may not any better understand what might be called the medical and surgical part of the dental art? The medical profession have no right to presume or take for granted that because a dentist has received a medical education he is skilled in the practice of his specialty, or that a full medical course will be any special qualification to that end, and when they come to better understand the scope and requirements of dentistry, they will undoubtedly hold to these beliefs.

In regard to dividing the art of dentistry into two departments, as spoken of in the paper, in my opinion and judgment it would be most unfortunate for either branch, both in study and practice—at least in the earlier years of one's practice. As the learning to handle and to use tools properly is so imperative to the dentist, it is certainly important that much of the time of pupilage should be spent in the laboratory and at the work-bench.

It is there that we not only learn the so-called artificial or mechanical branch of dentistry, but we learn the use of tools and instruments and become interested in their use, which is of the greatest value. It is there, without question, that the dental student should begin his education, with the use of suitable text-books, and, if after a fair trial, he finds no interest or pleasure in these things, he had better at once abandon the task and seek a more congenial occupation.

In the laboratory we may also learn to make our own tools and instruments, and so not be entirely dependent upon the instrument-maker, which many have found to be of immense advantage.

There will be evident incompleteness, both in the education and in the practice, if we separate the two branches.

Every person calling himself a dentist should be able to put up and adjust artificial teeth by the most approved methods, and in attaining the skill required for so nice a work of mechanical art he will learn many things that will be eminently useful in the operative department.

Dr. Cook. May I be allowed to say a word to set myself right? I seem to have failed to make myself understood in a very important point which I wish to emphasize; and that is, that in the early days of dentistry the best "mechanical" practitioners, "fillers of teeth," were medically educated.

Wm. H. Dwinelle who probably has done as much as any one man in this country now living to advance the art and science of dentistry, and has some reputation as a filler of teeth and mechanical worker, was early in life an M.D. There were gentlemen in the South whose names I do not now remember—medical men who had great reputation as dentists. We have some gentlemen with us this

evening, M.D.'s, who have greatly contributed to the advancement of our specialty—and I may mention Drs. Bronson, Atkinson, and Rich. What I want to emphasize is the fact that these gentlemen whose names I have spoken, and such as these—no more with us—have made it possible for the young men of our specialty to be what they are to-day.

Does the last speaker ask us to assume that every person who uses dental "tools" and "*pretends*" to "practice" dentistry is an accomplished dentist? If so, he is asking too much. Uneducated men and bunglers greatly abound. To-day the practice of dentistry is not what it was thirty or forty years ago—we are coming more and more to endeavor to save teeth from decay, as well as to treat diseased conditions, and so have need of all the medical and surgical knowledge we may or can obtain, bearing upon our specialty. If the fathers of the profession thought it necessary for them to be medically educated, how much greater is that need for the practitioner of to-day, when the various diseased conditions of the teeth are treated, and the teeth *saved*, instead of being cured by extraction, as was the general practice in regard to all the teeth except the incisors and cuspids, thirty years ago. Dr. Bödecker says he has not seen good gold filling from the hands of German dentists unless they have been in America, and intimates that the reason is because the dental students are required to study medicine. If they were not medical men would they fill teeth any better? I say no, it is not in consequence of a better education, but from lack of the trained ability, and more or less natural capacity for the work, that they are not good operators. Every specialty requires special training, in addition to the general education, and it is not true that a well-rounded medical education makes one less able to perform the finest operations.

Dr. Kingsley. I do not rise to take either side in a controversy about medically or non-medically educated dentists nor to depreciate in the slightest degree a medical education for a dentist, but I must dissent from the statement of a former speaker that all the most skillful practitioners of dentistry in the past—all those who have held the foremost rank and who have made the term American dentist a synonym for good dentist, were prepared for that position by a medical education.

As a class those men were not graduates of medicine before entering dentistry. It was an exceptional thing that one was a graduate, but it was not an exceptional thing for one who had distinguished himself as a dentist to be honored with the degree of M.D. by some medical college. Of my own personal knowledge there was a large number of such cases and most of the men of the generation now

passing away who had the title of M.D. received it in that way. I wish to express, then, my unqualified disapproval of the effort which has been made in a certain part of this country to divide the practice of dentistry as it now exists, confining the collegiate instruction in dentistry to oral surgery and operations on the natural teeth—ignoring all dental prosthetics and relegating all its requirements to the workshop of the mere mechanic where, without education or a mind above *mechanics*, the opprobrium of dentistry would be perpetuated.

I do not deprecate nor would I depreciate a medical education. I would not depreciate a knowledge of any or all the sciences, but I am impressed more and more every year with the fact that ninety-nine per cent. of the requirements made by suffering humanity upon a dentist are fully met by mechanical skill rather than by medical knowledge. This question becomes a very serious matter for a young man whose pecuniary circumstances force him into the most limited time for preparation. As the great bulk of the operations in dentistry require the development of a high degree of manipulative ability, he is far more likely to become a skillful practitioner if his limited time of study is devoted to mastering the specialty than if he attempts to first graduate in medicine and then learn dentistry.

Dr. Rich. I can hardly let this subject go by without bearing testimony to the fact that dentistry became a great profession in this country first, and it was made great by men of whom a large part had no medical education. If they had, it did not assist them in the reputation they made as dentists. Some of them never practiced medicine at all, although they may have had the medical degree. The man who, as we may say, built up the profession here in this city, Dr. Eleazer Parmly, had no medical education. The degree of M.D. was conferred upon these men by different institutions in recognition of their services to mankind after they had made themselves celebrated as practitioners in dentistry.

There has been something said about the acquisition of manipulative skill; without the proper organs that skill can never be acquired; no dental or medical education will give it. I don't want to be understood as disparaging the advantage of a medical education in a general way, but that a thorough knowledge of medicine is necessary in the practice of dentistry, pure and simple, I do not admit. A man who has skill to become a great operator in our profession would easily acquire all the surgical knowledge necessary for him, except in the branch of oral surgery, which is a new department.

Most of the men who have practiced dentistry in this country

with the title of M.D., were men who never practiced as physicians or as surgeons. There is Dr. Dwinelle; he went and got the degree, but he was a dentist from his boyhood. His business was dentistry,—filling teeth—and in that he made his reputation. The same may be said of Dr. Westcott, of Syracuse; he had a medical diploma, but he made his reputation as a *dentist*. Dr. Harris never practiced as a medical man, but through his writings he gave great honor to our profession. I might speak in this way of many others,—the fathers of our profession,—Dr. Hudson, of Philadelphia, Dr. Elisha Townsend, and Dr. Harwood, all men who have held honorable rank among us.

I do not undervalue any kind of education—anything that elevates the man; but without that certain combination of faculties that makes the skillful mechanical manipulator, all the diplomas of all the medical and dental colleges in the world will make nothing of him but an ordinary operator.

Dentistry has undoubtedly achieved its greatest success and respectability in this country, where it had its birth; here the first college was originated, and the attempt made to systematize and extend the knowledge which was in the hands of the few. In the organization of the American Society of Dental Surgeons, and the establishment of the *American Journal of Dental Science* many years ago, we made up our minds that we would give freely of our knowledge to everybody. We said that we would not withhold it from the veriest beggar who asked for it; we said that to the poorest man, who carries his instruments upon his back, we will give freely of all the knowledge that we possess, for in elevating him we elevate ourselves. (Applause.) We did that; we carried that out to the letter, and it required men who had already achieved reputation in the large cities to do it. They did it nobly, and knowing all these men as I did, in the early days of my practice, I cannot allow the medical profession any credit at all for the origin of the great profession which we claim as dentists. Neither French, nor German, nor English, had any skill,—they were miserable botches. All our great dentists of that day had to dig it out themselves. We must remember this when we are talking about this subject of dental education. Our profession has advanced, and our art has expanded because we have constantly added to our knowledge everything that we could from every department of science, and not from medicine alone.

Dr. Cook. Dr. Rich lays great stress upon the advance which dentistry has made, and upon the fact that it culls from every department of science. I would ask if this advance is peculiar to dentistry and if the advance in medicine, in surgery, in pathology, and in

every other department of knowledge has not been correspondingly great?

Dr. Rich. There is no science that was ever known that has made the same rapid advance as dentistry. Almost within my remembrance as a practitioner—quite within the recollection of my boyhood—the dentist was on a plane with the barber. Who that practices our profession is willing to be regarded with the barber now?

It was out of such beginnings that the science of dentistry has grown within the last forty-five or fifty years, to be so that in all its departments it has a good right to be called a liberal profession. No others have been as liberal in the diffusion of knowledge among the members of their calling as have the dentists.

Dr. M. L. Rhein. I never knew before this evening what an *honorable* and *distinguished* profession I had entered; but as one of the younger members of the profession, I would like to say a few words on the other side of the question. First, in regard to the history of dentistry. No one will think of questioning the wonderful advances we have made during the past fifty years, but at the same time I think a careful scrutiny of all the knowledge we possess on this subject will show that a great many mistakes have been made this evening, especially in regard to the recent origin of our profession.

The record of the practice of dentistry dates back further than that part of history which preserves to us the doings of the ancient Greeks and Romans; in fact just as old as the history of medicine itself. The earliest reliable knowledge which we possess, is that which we gather from the remains of Egyptians living, it may be under the iron rule of the Pharaohs. In the museum of England there are said to be mummies showing the dental practice of that time. Some are said to contain ivory teeth fastened on with gold to the natural teeth, and they also report others to contain fillings of the precious metals and of resinous substances. To prove further the fallacy of the idea that dentistry is something that has been brought to light in this century, let me say that all the ancient authors have written on dentistry, not only in regard to extracting teeth but also in reference to methods of filling and various other dental operations. To prove this assertion turn to the writings of Hippocrates, Galen, Ætius, Celsus, and others. Galen gives formulas for dentifrices. Of course, their methods were crude and generally erroneous, but in the face of all this how can any one say dentistry is of recent origin? It is true it has slept for a great many years and that its real awakening has only been very recent, but you can trace its history through every age down to the present time. It is needless for me to state the fact that John Hunter was the most

distinguished surgeon of his time. The benefits derived from his discoveries are well known to every scientist of to-day. He, the most eminent medical man of his time, was of the firm opinion that one of the most important parts of the body, the teeth, should be brought under the care and treatment of medical men. He devoted a large portion of his time to dentistry, and made many important investigations which were really the foundation of to-day's dentistry. Taking another view of the subject, is it possible for us to deny that we are practicing a specialty of medicine. "Medicine is that branch of science which relates to the prevention, cure, or alleviation of diseases of the human body." Are not the teeth portions of the human body? This being true, whether we wish to class ourselves with medical men or not, we can not deny the simple fact that we are practicing a specialty of medicine. Because through the prejudice or ignorance of medical men fifty years ago we were denied the right to call ourselves specialists of the science of medicine—that does not and should not prevent us from exercising that privilege to-day, and I think the younger men of the profession, at least the majority of those with whom I have conversed upon the subject, recognize the fact.

Is it necessary for us to cast a slur upon a man because he has risen from a lower calling, and now occupies an elevated position in the dental profession? Because he has gone still further upward and taken a thorough medical education, and seeing now the advantages, aye, the necessity of that education, has given the world the benefit of that experience,—is it therefore necessary for us to belittle him? For my part I would thank him for being so frank in admitting that he felt sorry that his career had not been up to the high standard it would have attained if he had had the benefit of a medical education from the start. Any man can enter a dental laboratory better equipped after a medical education, if for no other reason than that the additional experience his age and scientific training have brought him will better enable him to grasp at any idea.

In regard to the main question in the paper read this evening,—the opposition of the writer to the dental branches being divided,—I must oppose his view of this important question. I am of the firm conviction that much better results can be reached if the departments of operative and mechanical dentistry are practiced separately and distinctly. Here is the dividing line from an educational stand-point. The need for a thorough medical education for the mechanical dentist is not so apparent, for he merely requires a thorough knowledge of the anatomy and physiology of the oral cavity. On the other hand an operative dentist ought to have the benefit of a thorough

medical course, as complete as any college admits, for he should be competent to meet any difficulty in the oral cavity. I can not see how such an education will not prove to be of inestimable benefit to every dentist.

Dr. Rich. What does a man acquire in the study of medicine that would help him in the laboratory of the dentist? What does he get in the course of medical training that educates his fingers or his mind mechanically? We must not be carried away with this idea that medical education is the first thing to look after. It is not so; every man who has achieved reputation as a dentist knows better than that.

How do we know that the ancients practiced dentistry at all? Do we find in the writings of Galen or Hippocrates any details concerning the practice of dentistry?

Dr. Jarvie. Has it been proved that a single gold filling has ever been found in the tooth of a mummy?

Dr. Rich. No, sir. I have seen where pieces of gold sharpened to a point had been driven into a tooth in the mouth of a mummy and then cut off, but whether or not this was done by some one in later years for the sake of saying that the tooth was filled, thus showing that dentistry was practiced among the ancients, is unknown.

Dr. Rhein. I don't want the gentlemen present to think that I have been silenced by the remarks of the speaker who followed me, but the evening is too far advanced to answer him on the present occasion.

Dr. Kingsley. In this discussion I wish to be placed distinctly upon the record in the statement that I do not consider dentistry as being a specialty of medicine—only in a very limited degree. It is rather a mechanical art of the highest order and for its mastery requires far more mechanical training than it does of strictly medical knowledge.

A large majority of the ablest dentists in the past have come from the various mechanical trades—the jewelers, the machinists, the gun-smiths, the wagon-makers, shoe-makers, tailors, and what-not have each contributed very skillful men, and I would recommend to any young men contemplating the practice of dentistry that the best preparation he can make for it while passing his teens would be the acquirement of any art which would make him master of his fingers and of delicate tools.

Dr. Atkinson. I am on both sides of this question; inside and outside, and all around it. I hold that the dentist, like the poet, must be *born*. He must have the genius in him to enable him to make way against adverse circumstances. Of this we have many illustri-

ous examples among us who might be named,—those who had no teacher. But that does not imply that we should not accept the help of teachers. Are we willing to take the excellence of the past for our present standard? With what are we building? Building with matter, might, and mind to attain professional knowledge that may be taught? When we have that we can talk a great deal, and to the point. Genius must be trained to make it efficient. In all times teachers have held that what they taught was final. That has been their trouble; that is our trouble when we attempt to communicate what we know. We ought to have the humility and generosity to acknowledge what others assert they see. Many a man has outgrown his best ideal a number of times, and has gone higher and higher. Here is the great difficulty, that we talk as if we were stating finalities. Let us be prepared to accept the advance as we go.

I make the assertion that no other class of professional men has ever made such progress as that representing dentistry. Is this because dentistry has had better men? By no means; but because they have had better opportunities than others. How is it that they are ahead of medical men, and are making a better show? Simply because dentistry is more demonstrable, and we can show what it is and what it accomplishes.

We have had some very bad history to-night. Those who have most investigated the alleged fact of mummies having had their teeth plugged with gold, have the least confidence in the statement. We are apt to set up one aspect of truth as antagonistic of another; we should gather facts from all sources, and build up a better status for all who follow us, as so beautifully acknowledged by Dr. Cook to-night.

Let us not look lightly upon what we or others have done. Let us prove all things, and hold fast those which prove to be good; then we will have a more fraternal feeling towards those who come into our hands by that open frankness which should characterize professional intercourse, as mentioned by Dr. Rich. We can speak of this now, but let us remember when we were ourselves strangers to this sentiment. I have the reputation of being liberal; but when I was a stranger to this doctrine, small, mean, and narrow, it was for fear somebody would filch something from the little which I was conscious of possessing.

No really great mind can ever be insulted or overridden. The moment we find ourselves insulted, there is an undeveloped corner in us that needs illumination.

Adjourned.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

At a meeting of this association held December 12, 1882, the subject under discussion was the "Treatment of the Dental Pulp."

Dr. Buckingham said that when he began practice exposed pulps were destroyed and removed to the apex of the root, and the canal thoroughly cleansed. Recently the conservative treatment came into vogue and they were capped and efforts made to save them alive. He related a case in his own practice where by accident he had exposed a pulp, which he capped; when some years later he had occasion to remove the filling (of gold) he found the pulp alive, and he capped and refilled in the same way. Under what circumstances will a pulp die when it can be saved alive? and what is the condition of a pulp exposed by accident? are questions which until we can answer them understandingly leave us in the dark as to scientific treatment. The pulp is connected with the tooth but is not a part of it. If the pulp be cut, will a scar form as it would do on other parts of the body? Or, if bridged over by a capping, will secondary dentine be formed so as to close up the exposed point? Dr. Bödecker had spoken of this effort of the pulp at self-protection and recorded his observations of pulp-nodules found in the pulp-chamber. He would like to know more of this growth of secondary dentine, more indeed of the growth of primary dentine. He spoke of the different articles used for capping exposed pulps and thought lead good, both on account of its being soft and easily applied and as well because all the salts of lead were soothing to wounded or irritated parts. The manner of capping which had yielded the best results with him was the plan suggested by Dr. King, of Pittsburg. It consisted of mixing a small quantity of the oxide of tin with creasote or carbolic acid and applying this gently to the point of exposure. The surplus of creasote or carbolic acid was absorbed with soft spunk, capping with oxychloride of zinc. He thought this plan of treatment reasonable, as the oxide of zinc was sedative to irritated tissues. Oxide of zinc, lard, and carbolic acid made a soothing application to wounds, abraded or chafed surfaces. Carbolic acid was one of the best antiseptics, and would not destroy tissue unless used too strong. The pulp must be got into a healthy condition before success in treatment may be expected. Some pulps, though badly exposed, would tolerate anything next to them, and crown even indifferent efforts with success, while others with the utmost care and the best manipulation would defeat every effort to keep them quiet. There were some operators who used the heroic treatment of burring off the diseased part of the exposed pulp with the bur of the dental

engine, treating and capping the remaining healthy part, but he had no patients who would submit to this treatment. In cases of extirpation it was impossible to get all the nerve from some roots or to drill always through the *end* of the root. If a tooth were held in the hand and an effort made to drill through the foramen it would be found in many cases that it could not be done. He does not use creasote pure, but mixes it with a little water, when he caps by Dr. King's plan.

Dr. E. H. Neall said: When the tooth is tender to concussion only, or when the pulp is wounded by the excavator, he attempts to save the nerve alive; but if he suspects disease or congestion he devitalizes at once. To cap he uses a small lead disk made concave by pressing it with the end of the handle of an excavator. In the concavity he places a minute drop of sandarac varnish to hold it in position, and then covers this with the oxyphosphate of zinc.

Dr. E. C. Kirk referred to the success attending the proper use of carbolic acid in the treatment of exposed pulps. He had made some experiments with this material about two years ago to test its coagulating power upon albumen. Into several test-tubes, each containing an equal bulk of albumen from the egg, he poured the same volume of carbolic acid of varying strengths: to the first tube was added the strongest liquid acid that could be obtained; to the second tube a somewhat diluted acid was added; to the third a still weaker, and so on to the end of the series. The result in the first tube was a dense white coagulum which formed as a thin layer between the surfaces of the two liquids. This coagulum did not increase perceptibly after standing for several hours, showing that the action of the strong acid is self-limited. The coagula formed in the other tubes showed a regular gradation in volume and density as the acid was more dilute; that formed by the weaker solutions being soft and friable and without power to retain its form. He spoke of the method of treating serous cysts with strong carbolic acid advocated by Dr. R. J. Levis in his clinical lectures at Pennsylvania Hospital. In the treatment of such a condition, as for instance a hydrocele, his plan was to evacuate the contents of the sac through a cannula, and then inject through the same instrument by means of a suitable syringe about two (2) drachms of deliquesced crystals of carbolic acid, withdraw the cannula and close the wound with a piece of adhesive plaster. A slight feeling of warmth, but no pain, follows the operation, and there is no subsequent formation of pus. In these latter particulars it differs from tincture of iodine, which always gives intense pain, is frequently followed by dangerous sloughing, and always by an amount of inflammation sufficient to produce pus which must escape or be absorbed. From these facts and the experiments made with albumen he believed that strong carbolic acid,

in certain cases of pulpitis with exposure, was one of the best remedies at our command. When a patient comes with an exposed pulp for treatment we have to deal with an inflamed tissue or organ, which inflammation does not differ in its essential characteristics from an inflammation in any other portion of the body, except in so far as it is modified by the peculiarities of its position and surroundings. If we decide to make an effort to restore the pulp to a physiological condition by reducing the inflammation and capping, the use of carbolic acid is indicated. If the tooth has ached, it is more than likely that slight suppuration is taking place from the pulp at the point of exposure. When strong carbolic acid is applied the pain is lessened—carbolic acid being a local anesthetic—and a pellicle of coagulated tissue is formed which acts as a protective coating to the pulp beneath, preventing any irritation from the capping material which is to follow. This cap can be made of almost any non-conducting material cemented in with oxychloride or phosphate of zinc. Before the cement is inserted, however, the cavity should be painted with a resinous solution, such as Canada balsam in chloroform, to prevent any irritation to the pulp from the free chloride of zinc before the cement has set. Pulps can be treated in this manner with strong carbolic acid and the cavity closed at once without fear of subsequent suppuration from the action of the acid.

Dr. Kirk also spoke of the relative merits of oxychloride and oxyphosphate of zinc for filling approximal cavities in bicuspids and molars. He gave the preference to the oxychloride, as he had observed a greater tendency to renewed caries at the cervical wall in cavities filled with the phosphate cements. He had become satisfied that when caries did recur in such cases at the cervical margins it was the tooth-structure which suffered and was not a washing out of the cement, as had been often stated. This was evident from the fact that retaining grooves and lines in the walls of the original cavity were repeated by corresponding elevations in the filling which remained perfectly distinct even after extensive caries of the adjacent tooth-structure had taken place.

Dr. Chupein said that in cases of exposure of the pulp, or where the pulp was so nearly exposed as to have but a thin covering of dentine, he used Dr. King's plan, as referred to by Dr. Buckingham. He applied the rubber dam first and got the cavity as dry as possible, by means of the warm-air syringe, or by the application of absolute alcohol, which by its strong affinity absorbed all moisture from the dentine. He then flooded the cavity with strong carbolic acid and allowed it to remain while he prepared his paste of oxide of zinc and carbolic acid. With a large-sized rubber-dam or shoe-punch he cut out a small disk of tea lead. He laid this on a piece of soft

wood, and with the rounded end of an excavator made it concave. The concavity he filled with the paste. He then wiped out the carbolic acid from the cavity and placed this disk over the point of exposure. If there was no exposure, he used no disk, but covered the floor of the cavity with the paste. With soft pieces of spunk he absorbed the excess of carbolic acid and scraped away any that had flowed too near to the cervical or other borders of the cavity. He then filled the remainder of the cavity either with the oxyphosphate or oxychloride of zinc—preferably the latter. He liked the working qualities as well as the behavior of the oxychloride better than those of the oxyphosphate. Like Dr. Kirk, he had noticed cases of complete failure of the oxyphosphate at the cervical margins and also recurrence of decay at this point; whereas, with the oxychloride, although there might be wasting or washing away of the material, there was no new decay of the tooth at this point. If mixed quite thick, the chloride of zinc could be placed in a cavity over the cap without giving pain, and from the fact that it could be inserted little by little, and yet would coalesce, a better filling could be made with it than with the less tractable oxyphosphate. He had been more successful in capping in cases of complete exposure, than where there was a thin covering of decayed dentine over the pulps, and in some cases he preferred to expose the pulps rather than to rely on this covering. To create an exposure with as little pain as possible he cut carefully all around the pulp leaving a little hill or elevation of dentine, and then by a sharp quick cut exposed the pulp under this elevation. The hemorrhage from the pulp he arrested with pure carbolic acid and then proceeded as already described. He thought it was useless to fill or cap until entire quiet was secured. To obtain this his favorite obtundent was chloroform followed by creasote or carbolic acid; but when these failed to secure quiet he had lately been very successful with a mixture of equal parts of chloroform, creasote, strong tinct. aconite, laudanum, and glycerin.

Dr. Buckingham thought the point made by Dr. Kirk in his experiments on albumen valuable. The strong, resistent coagulum produced by strong carbolic acid was what was wanted to give the pulp a chance to heal under a capping, and he recommended its trial.

DENTAL DEPARTMENT OF THE UNIVERSITY OF MARYLAND.

The annual commencement exercises of the Dental Department of the University of Maryland will be held at the Academy of Music, Baltimore City, March 15, 1883, at 12 M. The dental profession is respectfully invited to be present.

Ferdinand J. S. Gorgas, M.D., D.D.S., *Dean.*

ALABAMA DENTAL ASSOCIATION.

The fourth annual meeting of the Alabama Dental Association will be held in Montgomery, Ala., Tuesday, April 10, 1883. All are cordially invited, and an interesting programme may be anticipated.

E. Wagner, D.D.S., *Secretary*,
P. O. Box 138, Montgomery, Ala.

ALABAMA BOARD OF DENTAL EXAMINERS.

The State Board of Dental Examiners of Alabama will hold their third annual meeting in Montgomery, Ala., commencing Tuesday, April 10, 1883, at the same time and place with the Alabama Dental Association. All parties desiring to practice dentistry in the State must make application for license on the first day of the session.

T. M. Allen, D.D.S.,
Secretary, Eufaula, Ala.

AMERICAN DENTAL ASSOCIATION.

The secretary of the American Dental Association is desirous of completing enough entire series of the Transactions to enable him to place one in each of the principal public libraries of the country and asks the cooperation of the profession in the work.

One dollar each will be paid for one or more copies of the Transactions for the years 1862 and 1863.

Geo. H. Cushing, *Secretary*,
34 Monroe Street, Chicago, Ill.

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

The thirteenth annual meeting of the South Carolina State Dental Association will be held at Aiken, April 17, 1883. A cordial invitation to be present is extended to all reputable dentists.

G. F. S. Wright, *Secretary*,
Columbia, S. C.

SOUTH CAROLINA STATE BOARD OF DENTAL EXAMINERS.

The South Carolina State Board of Dental Examiners will be in session for the examination of applicants for license to practice dentistry, during the sessions of the State Dental Society, at Aiken, April 17, 1883.

G. F. S. Wright, *Secretary*,
Columbia, S. C.

NEW YORK COLLEGE OF DENTISTRY—A DENIAL.

Office of the Dean, 22 West 40th Street,
New York, February 5, 1883.

J. W. White, M.D., Editor Dental Cosmos:

My Dear Sir:—In the transactions of the "American Dental Association," published in the February number of the Dental Cosmos, on page 69, appears the following: "And we have a school in New York, that upon a threat of a pupil whom they proposed to pluck gave him the diploma." I will not say that the gentleman who made that statement told a *deliberate falsehood*, nor that he *maliciously repeated a falsehood* told by some one else; but I will say that if I should make such a statement, *knowing all* the *facts* in reference to all the graduates of the "school in New York" for the last fifteen years, I should feel guilty of having done one or the other.

Yours, very respectfully,
Frank Abbott, M.D.

EDITORIAL.

THE HYGIENIC RELATIONS OF ARTIFICIAL DENTURES.

Dr. E. C. Kirk is engaged in the preparation of a monograph on "The Hygiene Relations of Artificial Dentures," and is desirous of obtaining the experience of others relating to the subject. He would be very much indebted to any who would favor him with their experiences in individual cases, or their opinions derived from observations in practice.

The discussion of the topic is intended to include the relative effects of various bases upon the health of the mouth, the rapidity of absorption, etc., and the rationale thereof, as well as the constitutional relations involved.

The subject is of such importance that it would be well if those who have positive convictions, based on observations in practice, would take this opportunity of massing their testimony, and so furnishing material for the basis of a scientific presentation of the principles involved.

Dr. Kirk's address is No. 1602 Arch Street, Philadelphia.

AMERICAN DENTAL ASSOCIATION TRANSACTIONS.

We ask attention to a notice, under the heading of Societies, from the secretary of the American Dental Association, calling for certain copies of the Transactions, in order that he may place full files of them in each of the principal public libraries of the country.

BIBLIOGRAPHICAL.

Microscopical Morphology of the Animal Body in Health and Disease. By C. Heitzmann, M.D., late Lecturer on Morbid Anatomy in the University of Vienna, Austria. New York: J. H. Vail & Co., 1883. Price, cloth, $7.00; half morocco, $8.00.

This volume of over eight hundred octavo pages presents in a collected form the views of the author upon the normal and pathological structures which constitute the various tissues of the human body, considered in regard to their histogenesis and histology. The work is chiefly made up of the numerous papers which have from time to time been published in foreign and American journals by the author during the past ten years, together with papers and abstracts by other writers upon the subject of the book, mostly prepared under the author's supervision and at his suggestion, and most of which have also been previously published. These latter are all given as evidence of the correctness of the author's views.

It is therefore seen that we have no new views and theories before us insofar as concerns the author, but another plea for the acceptance of opinions which have been urged by this writer at intervals during the past decade. These views, differing so very materially from those held by most writers and teachers of the present day, touching the very foundation, and indeed overthrowing the entire structure of our ideas upon the nature and origin of tissues, call for careful investigation; whether they are correct or not we will not presume to decide. This question time and further research can only determine. That they have only been accepted by very few investigators, and these pupils of the author, notwithstanding they have been advanced for some years, would seem to indicate some doubt, if not unbelief, as to their correctness. This slowness in adopting a view is not to be wondered at when we consider that it does away with the very foundation upon which we have for the past thirty and more years built our anatomy, physiology, and pathology. To dismiss the cell-theory as obsolete, is certainly asking much, more indeed than most are willing to concede. This our author, however, makes absolutely imperative if we are to become his disciples.

The first section is devoted to the preparing, staining, and examining of tissues; it is headed "methods." We here find the experience of one who is quite familiar with the technical working of histological studies, and although we do not agree with him upon all points, yet the general rules and outlines of manipulation are good.

The importance of the preservation of tissues for microscopical examination is prominently pointed out. Here, with the author,

would we urge the necessity of carefully attending to this department of microscopical working. Only too frequently are we compelled to throw aside, as utterly worthless, specimens sent for examination, on account of the changes undergone from decomposition, which a little care in attending to their preservation would have prevented. Our author gives decided preference to a chromic-acid solution (one-half per cent.), the tissue to be in small pieces (one or two inches in diameter) and the solution to be frequently changed Müller's fluid, bichromate of potassium, chromate of ammonium, and picric acid are also recommended. Alcohol is objected to on account of its tendency to cause shrinking of the tissue. This objection we think, can in a great measure be avoided if care is taken. Place the specimens first in a weak alcohol (alcohol one part, water three), for a day or two, and at varying intervals increase the strength of the alcohol. By following this method we have been able to obtain results quite as satisfactory as when other of the various recommended hardening fluids were employed, and we think with much less trouble.

The directions for cutting thin sections for microscopical examination are full and quite sufficient. To a physician who wishes to employ the microscope as a means of assisting him in the practice of medicine, the fewer mechanical and complicated apparatuses he burdens himself with the better and the more will he use his microscope for investigation. The various complicated instruments invented for making thin sections are useful in the laboratory, and to those who make a business of section cutting, but they are not needed by the physician.

The only suitable medium recommended for mounting hardened specimens is diluted glycerin and it is said to be the one most easily manipulated. We have used this fluid and found it quite satisfactory but cannot agree in considering it the only one to be recommended. Canada balsam and Damar varnish have given us equally good results. That specimens are more easily mounted in glycerin than in other fluids can best be answered by those who have had experience with the air-bubbles of the former.

In regard to staining the tissues the author gives the choice to chloride of gold and nitrate of silver solutions. Carmine is said to be very unreliable and may be dispensed with; the specimens are only beautiful and of no material value. We may be somewhat old-fashioned in our ideas, and perhaps have a tendency to hold on to old ways; indeed we may go so far as to think contrary to our author and say our experience, and that of most writers upon microscopical technology, agree with us in considering that the gold and silver solutions are of all reagents the ones most unreliable in their action upon tissues and the ones which have most frequently led to false conclusions by producing artificial results. But we fully concur

in the following: "A great deal of time is wasted by applying manifold staining methods to microscopic specimens, and they are deceived persons who imagine that the value of a specimen is the greater the nearer it approaches a rainbow appearance. In wasting time by projecting images on screens by means of complicated mechanisms many forget that microscopy can really be learned only by handling the microscope, and both eyes and judgment can be educated only by looking into the microscope itself."

Section ii., "*The arrangement of the living matter in protoplasm*," gives us the author's peculiar views in regard to the structure of the entire body. This doctrine is founded upon a study of the amœba, which is said to consist of a nucleus from which radiate conical threads having their base directed towards the nucleus and their apex towards the periphery of the animal. A contraction and extension of these threads gives us the peculiar motion termed amœboid. This same arrangement and power of movement have also been observed by our author in the blood-corpuscles of the craw-fish, colorless blood-corpuscles of the newt, and colorless blood-corpuscles of man; therefore he concludes: "The nucleolus, nucleus, and the granules, with their connecting filaments are the living or contractible matter proper." A non-living, not-contractible liquid is found in the spaces left by the reticulum, and an increase of this liquid results in the formation of vacuoles. Other observers have described this reticulated structure of cells. Upon this point we must confess to being somewhat skeptical, notwithstanding very high authorities have given it their sanction. If we examine the conditions under which this reticulum has been observed, it is found necessary in order to see it that preliminary preparation be employed to place the cell in a condition favorable for this investigation, and we are much inclined to think it possible that the picture is an artificially produced one. It may be our own want of acuteness of seeing, but in living, unchanged corpuscles the so-described reticulum, although sought for, has never been seen by us.

From these researches upon the amœba and colorless blood-corpuscles, our author builds up the most intricate tissues and organs. "The analysis of a single protoplasmic lump is of the greatest importance, inasmuch as such a lump is the simplest animal organism, on the plan of which are built up all, even the most complicated organisms. It will be demonstrated further on that the human body is constructed on the plan of an amœba, and the comparison will be carried out in all details. Man is a complex amœba with permanent protrusions, the extremities, with a wonderfully complicated division of labor of the groups of the living matter. Man, in toto, is an individual, as is the amœba, and in both, isolated lumps of living

matter float about—in the one case in vacuoles, in the other in the blood- and lymph-vessels."

Section iv., "*The phases of development of living matter.*" This section may be briefly outlined as follows: Protoplasm shows differences according to its age; the youngest consists of a compact lump of living matter, homogeneous, stained by carmine and chloride of gold; no reticulum can be here demonstrated. In this condition it is termed "hematoblastic," and capable of producing both red-blood corpuscles and wall of the vessel. When undergoing development, a vacuolated condition is the first noticeable change in this hematoblastic substance, and there results a reticulum of the peripheral portion, the nucleus remaining homogeneous. "This condition," says our author, "furnished the scheme of the cell of the authors." We are told that "there is no such thing as an isolated individual cell in the tissues." What was formerly thought to be a cell is, according to this view, "a node of a reticulum traversing the tissue." Indeed the term cell is said to be a misnomer which histologists must avoid using, and in its place the author proposes the word "plastid," originated by Hæckel, to designate a formerly so-called cell, and for protoplasm we are to use the word "bioplasson." These terms are of themselves not objectionable, and, although the word cell is not positively correct, insofar as it is now applied to a living mass of protoplasm, without regard to shape, size, or contents, it will probably continue to be employed by histologists and biologists to express what they consider to be the primordial element.

Somewhere we have read that the microscope is simply an instrument to assist in investigation; it defines no doctrine, and forms no theory. What the scalpel is to the anatomist, the same is the microscope to the histologist. It is a means by which we are aided in our medical studies, and we have always been an advocate for a thorough knowledge of its use; appreciating fully the many advantages it gives the practitioner in solving the difficult problems of diagnosis which may arise in the course of his professional life. We have expected much, and, in truth, have received much assistance from the employment of the microscope; but we have not, as yet, carried our expectations so far as to believe that the examination of a colorless blood-corpuscle will determine the present, past, and future condition of the individual from whom the corpuscle under examination was obtained. This seems like a very visionary view of the power of the microscope, and as such we cannot but consider it; yet this power is not only thought possible, but positively believed in by our author, as the following quotations show:

"This fact has been made use of in hundreds of cases, when pus-corpuscles, mainly in urine, were brought by different physicians to

my laboratory for examination, for telling whether the pus belongs to a good or a bad constitution, of course without any knowledge of the patients themselves. I was right in every instance; not one mistake has occurred."

"About one year ago I announced that the colorless blood-corpuscles also demonstrate striking differences as to their minute structure, according to the general constitution. I said that the colorless blood-corpuscles are coarsely granular, and slow in their amœboid motions under the microscope, if taken from healthy, vigorous, strong persons; on the contrary, they are pale gray, finely granular—viz., poorly provided with living matter—in broken-down or phthisical individuals. I expressed my hopes that at some future time practical use might be made of these differences. To-day my hopes have turned, after three years' earnest study, into accomplished facts."

"Thus I have arrived at a point of perfection which allows me to tell the constitution of a person without knowing anything of his former life." "In fact, the microscope reveals so much of the general health of a person that more can be told by it, in many instances, than by the naked eye, or by physical examination." "Life insurance should be based upon microscopical examination, as well as on percussion and auscultation. Marriages should be allowed in doubtful cases, only upon the permit of a reliable microscopist."

That such a power is possessed by the microscope, we must sincerely trust may be verified by other investigators, and in the words of our author, we add: "Let us proceed in skillful, honest work, and we shall succeed in raising the standard of the microscope still higher, and make it not only a valuable, but rather an indispensable assistance to clinical work."

The classification of the tissues is made according to the manner in which the living matter (reticulum of bioplasson) is distributed, and by the chemical changes of the fluid contained in the meshes of the reticulum. From this view our author finds only four elementary tissues in the animal body viz., connective tissue, muscular tissue, nerve tissue, and epithelial tissue. Such a classification, if we accept the theory of the author, in regard to the structure of the tissues, is all-sufficient, but it does not include all the tissues (blood, lymph, and compound tissues), as we have been accustomed to study them.

Turning to section x., which gives the normal and pathological histology of the teeth, we find it to consist of abstracts from a series of papers, six in number, four by C. F. W. Bödecker and two by Frank Abbott, all of which have appeared in this journal, and are more or less familiar to our readers.

The first of these papers relates to the normal histology of the teeth, and was published by Bödecker under the title of "The Dis-

tribution of Living Matter in Human Dentine, Cement, and Enamel," in 1878 and 1879. The researches of this writer go to establish the uniformity of structure in the tissues as advanced by Heitzmann, that is, the distribution of the living matter (protoplasm) not only in the plastids (cells), but also in the basis- (intercellular) substance, or in other words, a continuous net-work of protoplasm with nodes, which traverses the entire substance of the teeth. The analogy to bone is demonstrated by the dentine possessing a system of canaliculi, termed "dentinal canaliculi," which communicate with other very delicate canaliculi, thus forming a complete net-work of minute canals throughout the basis-substance. Through these canaliculi ramify fibers of bioplasson (protoplasm) which are in direct connection with the living matter (cells) of the pulp, cementum, and enamel.

The cementum is provided with lacunæ, which contain nucleated plastids (cells); these latter give off processes which pass into the canaliculi, and form a net-work in the basis-substance. There is an uninterrupted connection of this net-work of protoplasm of the cementum with that of the dentine and pericementum, either through the intervening plastids (cells) in the interzonal layer, or with the dentinal fibers.

The enamel consists of the enamel-rods, between which run fibers of living matter (protoplasm) connected by delicate transverse fibrillæ which pierce the enamel-rods in a vertical direction. These fibers are connected on the outer surface with the covering epithelium, and on the inner surface with the dentinal fibers.

This view of the histology of the teeth differs from that given by other writers upon this subject, in that there is said to be present throughout the entire tooth a continuous net-work of canaliculi, through which pass processes or ramifications from the cells of the pulp and from those contained in the lacunæ. It is unfortunate that such a system of canals and ramifications of protoplasm cannot be demonstrated and that we must accept part of it on faith; thus Bödecker says, "although we cannot trace the living matter throughout the whole net-work in the basis-substance, we are justified in assuming that not only the dentinal canaliculi but the whole basis-substance of the dentine is also pierced by a delicate net-work of living matter." On the other hand Waldeyer in describing the peripheric termination of the dentinal tubuli says, "no positive conclusion can be drawn. It is not easy to decide whether the fibers are present in the finest peripheric ramifications of the tubules. A direct passage of the dentinal tubuli into the enamel does not occur. The enamel-fibers lie in close contact with each other without any demonstrable intervening substance." Magitot says in reference to the

enamel-rods that they are "intimately united without the interposition of any other substance."

Where there is such difference of opinion among those who have especially studied these structures, it remains for us to wait until further investigations can decide the question. It is but just to add that in the paper by Dr. Abbott on "The Minute Anatomy of Dentine and Enamel," he found on examining specimens of caries of the teeth that dentinal fibers ran through the canaliculi up to the bifurcations, close to the enamel, and he was able to trace the lateral conical offshoots of the dentinal fibers to the point where they enter the basis-substance of the dentine.

The normal dental pulp is considered by Bödecker to be a variety of connective tissue—myxomatous—in an embryonal form, which contains some delicate fibrous tissue, arteries, veins, nerves, and lymphatics. The nerves are both medullary and non-medullary, the latter found at the periphery of the pulp, where they terminate as knobs or pass between the odontoblasts. A direct inosculation of the nerve-fibers with the dentinal fibers has not been demonstrated. The odontoblasts he terms rows of "bioplasson formations" at the periphery of the pulp. The dentinal fibers have their origin between the odontoblasts, termed formations of living matter, and are directly connected with the reticulum of the odontoblasts and with that of the basis-substance of the dentine. Thus is formed the universal reticulum of Heitzmann. This is a view of the structure of the pulp in which cells are said not to exist, but that all living matter is connected in such a manner as to form a continuous net-work. From our studies and investigations in histology we have not as yet been convinced of the incorrectness of the cell-theory as it is now understood, and it is therefore not possible for us to accept views which are a direct contradiction to it.

Passing to that portion of the book which treats of the pathological changes that the tissues are liable to undergo, it is seen that our author bases his views of these changes upon the reticular arrangement of the bioplasson (protoplasm) and a denying of the cell-theory. Thus in the section which treats of inflammation we find the following: "The facts above enumerated lead to the conclusion that a cellular pathology, according to the theory of Virchow, cannot be maintained, for in the tissues of the animal body there are no 'individuals,' no 'cells,' and consequently can be no isolated 'cellular foci of disease.'"

From our reading of the "facts above enumerated;" we are still in doubt as to the correctness of these facts, and still do we believe in a cellular pathology, and still uphold the existence of cells, and finally, still look upon the possibility of cellular foci of disease.

The section on tuberculosis calls for a careful reading, as it contains much important matter, and by disregarding for the present the peculiar views of the author in reference to the structure of the tissues—the reticulum—it will be found instructive. The parasitic origin of tuberculosis is only mentioned to be condemned. In this we agree with our author. That a bacillus is present in tuberculous foci, actual observation convinces us, but that it is the specific cause of tuberculosis we do not yet believe, and decidedly protest against classifying this disease among the contagious, infectious maladies.

Before concluding our remarks, which have already exceeded the space allotted to us, we wish to call attention to the section on tumors. In reference to the etiology of tumors, the opinion of our author so fully meets our views that we quote it: "It is an easy matter to explain the cause of the formation of a tumor by the terms '*general diathesis*,' or '*general or local disposition*.' Is there anything satisfactory in such an assumption? Is it not more correct to honestly admit that we do not know the real etiology of a tumor?"

The inflammatory origin of tumors has recently been ably presented, and has many advocates, yet we cannot accept it as an exclusive cause. That tumors have followed the inflammatory process is only too often verified by clinical experience, but how very much more often has inflammation existed, and no such result supervened. Why this is true, we are unable to determine; it only indicates that inflammation alone and by itself is not a sufficient cause. The embryonal theory, as a cause of tumors, is very seductive, but does not admit of actual demonstration.

The connective-tissue theory, as being the exclusive origin of tumors, is not sustained by careful investigation. The view that epithelial tumors (carcinomata) are only developed from pre-existing epithelia, we think, from many examinations of this class of tumors, cannot be positively claimed. The author's view is that all tumors originate from indifferent or medullary elements; that no tissue can increase or pass into another, except through the intervening stage of medullary tissue, and no tumor arises from a normal tissue without the latter first passing through the same intervening stage. In other words, the tissue first returns to the embryonal state, and then the tumor is developed. This view has also been maintained by others, and has much to recommend it; indeed, if we were inclined to accept any exclusive theory, its claims seem very strong.

It has not been our purpose to make a complete analysis of the work before us, but by giving an outline of the views of the author upon the histogenesis and arrangement of the structure of the tissues, we have shown the foundation upon which most of his opinions are based, and, although we cannot accept all his views,

yet we are glad of the opportunity of studying them. The book contains much valuable information, and much that should stimulate those interested in the subject to further investigations.

J. HENRY C. SIMES.

THE PRINCIPLES AND PRACTICE OF SURGERY. By JOHN ASHHURST, Jr., M.D. Third edition, enlarged and revised, with 555 illustrations: 1064 pages. Philadelphia: Henry C. Lea's Son & Co., 1882. Price, cloth, $6.00; sheep, $7.00.

It is impossible in the space at our disposal to give an adequate notice of this handsome volume. It furnishes in as concise a manner as is compatible with thoroughness, explicit descriptions of the modes of practice now generally employed in the treatment of surgical affections, and a lucid exposition of the principles upon which such practice is based. The more important recent observations in surgical science and practice have been incorporated, the previous edition carefully revised, and many new illustrations added, affording a reliable and comprehensive representation of modern surgery.

A TREATISE ON FRACTURES. By LEWIS A. STIMSON, B.A., M.D. With 360 illustrations on wood; 598 pages. Philadelphia: Henry C. Lea's Son & Co., 1883. Price, cloth, $4.75; sheep, $5.75.

The special department of surgical science and practice included in the word "fractures" is here presented in a systematic, comprehensive, thorough, and yet concise manner. Under the head of generalities are included definitions, statistical tables, influence of age, sex, and season. The varieties of fracture are explained, and resulting displacements; the etiology—predisposing and determining causes—considered; symptoms and diagnosis, repair, complications and remote consequences of fracture; treatment; delayed, deformed, faulty or vicious union, and general prognosis. Successive chapters treat of fractures according to location. The numerous illustrations render the descriptions easy of comprehension. Paper and typography are unexceptionable.

HYGIENIC AND SANATIVE MEASURES FOR CHRONIC CATARRHAL INFLAMMATION OF THE NOSE, THROAT, AND EARS. By THOMAS F. RUMBOLD, M.D. Sixteen illustrations, second edition. St. Louis Medical Journal Publishing Co., 1882.

The author claims to have made the hygiene of catarrh a constant study for a period of twenty years. He insists that this common, persistent affection can be successfully managed only by the constant observance of hygienic rules, and that a continued observance of these rules is essential even after a cure, to prevent recurrence of the complaint; that dress and habits are largely instrumental in preventing

or producing the condition, and that with proper attention to the laws of health a large number of cases will recover without other aid. He denounces the use of tobacco as predisposing, producing, and maintaining catarrhal disease. A chapter is devoted to the illustration of the effect of diseased teeth and gums in causing abnormal conditions of the mucous membrane of the nasal and pharyngo-nasal cavities, and to the injurious impressions made upon the health of the mouth by catarrhal inflammation of the antrum of Highmore.

The book is intended both for the physician and as a guide for persons afflicted with catarrh, treating of dress, temperature, ventilation, diet, stimulants, exercise, etc. It should secure the thoughtful attention of all who are suffering from catarrhal troubles.

Medical Electricity. A Practical Treatise on the Application of Electricity to Medicine and Surgery. By Roberts Bartholow, A.M., M.D., LL.D. Second edition, enlarged and improved, with 109 illustrations; 287 pages. Philadelphia: Henry C. Lea's Son & Co., 1882. Price, cloth, $2.50.

The exhaustion of the first edition of this treatise within a year, indicates the need of a text-book on medical electricity. The aim of the author was to prepare a work from the practitioners' rather than the merely scientific stand-point; so simple in statement as to be readily understood by a student without previous acquaintance with the subject; so complete as to embrace all that is essential to the medical practitioner, and withal condensed into a moderate compass. As an exposition of the application of electricity as a remedial agent, it deserves the perusal and study of every practitioner who employs that agent in the treatment of disease.

Early Aid in Injuries and Accidents. By Dr. Friedrich Esmarch, Professor of Surgery at the University of Kiel. Translated from the German by H. R. H. Princess Christian. Philadelphia: Henry C. Lea's Son & Co., 1883. Price, 75 cents.

This volume contains the translation of five lectures delivered by Professor Esmarch before the "Samaritan School," the object of which is to qualify its members to render efficient aid in sickness, emergencies, and accidents. The first lecture gives elementary instruction in anatomy, three are devoted to the proper measures to be adopted in various injuries; and the fifth to transportation of the sick or injured. Several pages are devoted to the antiseptic treatment of wounds—the hobby of the author. The directions for the proper procedure in given cases are plainly presented, and it would be well if they were familiar in every household.

A COMPEND OF THE PRACTICE OF MEDICINE, especially adapted for the use of Medical Students. By DANIEL E. HUGHES, M.D. In two parts. Part I. Philadelphia: P. Blakiston, Son & Co., 1882. Price, $1.00.

A COMPEND OF OBSTETRICS, especially adapted for the use of Medical Students and Physicians. By HENRY G. LANDIS, M.D., with illustrations. Philadelphia: P. Blakiston, Son & Co., 1883. Price, $1.00.

A COMPEND OF HUMAN PHYSIOLOGY, especially adapted for the use of Medical Students. By ALBERT P. BRUBAKER, M.D., Philadelphia: P. Blakiston, Son & Co., 1883. Price, $1.00.

We have here three more of the series of "Quiz Compends" announced by the publishers. The first, "Questions on Human Anatomy," was noticed in our December issue. Each of them appears to be a decided improvement over any other book of its class which we have seen. They are concise, thorough, and systematic. As ready reference for the physician and reminder to the student, they are excellent condensations of the salient features of the several subjects embraced.

When this series is completed, it will certainly form the most compact library of medical information which could be imagined—truly multum in parvo.

POCKET THERAPEUTICS AND DOSE BOOK. By MORSE STEWART, Jr., B.A., M.D. Third edition, revised and enlarged. Detroit, Mich.: George D. Stewart & Co., 1882.

The contents of this book are set forth on the title-page as follows: "Classification and explanation of the action of medicines; minimum and maximum doses in Troy weights, with their equivalents in the metric weights; genitive endings of all medicines and preparations given in italics; index of common and pharmaceutical names; index of diseases, with appropriate remedies; tables of solubilities; illustrations and examples in prescription writing; poisons, their symptoms, antidotes, and treatment; incompatibles and antagonists; useful hints to the prescriber, etc."

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION FOR 1882. Philadelphia: The S. S. White Dental Manufacturing Co.

This is a beautiful volume of 162 pages. It contains an orderly epitome of the proceedings; the reports of the various Sections; the discussions which followed their reading; voluntary papers and their discussion,—covering a considerable range of subjects of interest to the profession. A full table of contents affords ready refer-

ence to topics and speakers. It is printed on good paper, and the typographical appearance is excellent.

TRANSACTIONS OF THE ILLINOIS STATE DENTAL SOCIETY FOR 1882. Press of the "Ohio State Journal of Dental Science," Toledo, O.

The transactions of the Illinois State Dental Society, at its eighteenth annual meeting, held at Quincy, May 9, 1882, make a volume of nearly two hundred pages. It contains the usual reports of the proceedings, papers, and discussions, printed from clear type and on good paper. It is embellished with an excellent portrait of the late Dr. M. S. Dean.

HISTORY OF THE INDIANA STATE DENTAL ASSOCIATION, AND TRANSACTIONS FOR 1882. Press of Baker & Randolph, Indianapolis.

This pamphlet, containing the transactions of the Indiana State Dental Association, at its twenty-fourth annual session, held in Indianapolis, June 27–29, 1882, is of more than ordinary interest, from the fact that the proceedings proper are prefaced by a short history of the Association, from its formation in 1858 to the present time.

DEUTSCHE MONATSSCHRIFT FÜR ZAHNHEILKUNDE. Redgirt von Dr. ROBERT BAUME. Verlag von Arthur Felix, Leipzig.

The above title represents an old friend under another name, being a change of the "Vierteljahrsschrift" from, as its title indicates, its quarterly character to a monthly issue. The editor and publisher are to be congratulated on the continued success of this time-honored and justly celebrated German journal. It has always been the organ of the very best element in German dentistry and has done a great work in molding dental thought in that country and leading it into more liberal channels. The old quarterly could hardly be improved upon but the new form is more nearly in accord with the demand of the age for the freshest material and latest developments.

OBITUARY.

DR. S. H. McCALL.

DIED, at Binghamton, N. Y., December 10, 1882, of pleuro-pneumonia, Simeon Howell McCall, in the fifty-ninth year of his age.

Dr. McCall was born at Franklin, N. Y., January 24, 1824. He was a graduate of Woodstock Medical College, and practiced medicine at Franklin and Batavia, at the latter place having charge of the Sanitarium. He subsequently entered the office of the late Dr. Fellows, at Albion, for the purpose of studying dentistry, and since

1855 has resided and practiced that profession in Binghamton. He was a prominent member of the New York State Dental Society, of which he had been vice-president and censor, and a prime mover in establishing the Sixth District Dental Society, in which he took a deep interest. Dr. McCall was a skillful and conscientious operator, and was possessed of an inventive faculty, which was exhibited in improvements in apparatus and methods of practice. His unassuming manners and genial disposition won for him the affection and confidence of his associates. He leaves a wife, one daughter, and five sons.

DR. D. A. ROBERTSON.

Dr. D. A. Robertson, whose death is announced as having occurred at Greensboro, N. C., from Bright's disease, was regarded as one of the leading dentists of the State. He was born in Lexington, Va., in 1835, being in his forty-eighth year at the time of his decease. He resided successively at Chapel Hill, Hillsboro, and Greensboro, locating at the latter place about ten years since. At each of these places he practiced dentistry with marked success, and established a reputation for proficiency as an operator. He was a man of fine character, and was universally esteemed.

DR. S. H. WHEELER.

Died, at Charles City, Iowa, January 18, 1883, of consumption, S. H. Wheeler, D.D.S., in the thirtieth year of his age.

Dr. Wheeler, though a young man, was rapidly gaining a substantial reputation as a practitioner of dentistry. In his decease the dental profession and the community lose one who had a promising future before him, and whose worthy personal characteristics won for him a large circle of friends.

DR. JAMES H. MANN.

Dr. James H. Mann, a prominent dentist of Poughkeepsie, N. Y., died in that place on November 3, 1882, in the fifty-seventh year of his age. Dr. Mann had been in practice for many years, and was a man of intelligence and capacity.

DR. HENRY BARRON.

At a special meeting of the St. Louis Dental Society, held January 15, 1883, the following resolution was unanimously adopted:

Resolved, that it is with sincere regret that this society learns of the death of Dr. Henry Barron, who, as a professional man and a citizen, has ever been held in

the highest regard. He was affable and kind, and industrious to a degree that has probably shortened his days. In his death our profession has lost a most worthy member, and the community a deserving and most excellent man.

JAMES W. WHIPPLE, *Recording Secretary.*

PERISCOPE.

SCURVY.—Dr. Buzzard, in a letter which appeared in our columns last week, considers the fact that the crew of the Eira were supplied with *preserved* vegetables tells against the supposition advanced by Mr. Neale, that if Arctic voyagers were to feed only on the flesh of animals supplied by the country they would be able to dispense with lime-juice. The truth is, it is an open question with many as to the relative antiscorbutic properties of *preserved* vegetables, and whether under the circumstances in which the Eira's crew were placed they would have been sufficient, in the absence of lime-juice and fresh meat, to have preserved the crew from scurvy. A case in point is the outbreak on board the Adventure, in the surveying voyages of that vessel and the Beagle. The Adventure had been anchored in Port Famine for several months, and although "pickles, cranberries, large quantities of wild celery, preserved meats and soups, had been abundantly supplied," still great difficulty had been experienced in obtaining fresh meat, and they were dependent on an intermittent supply from wild-fowl and a few shell-fish. Scurvy appeared early in July, fourteen cases, including the assistant-surgeon, being down with it. At the end of July fresh meat was obtained; at first it seemed to prove ineffectual, but an ample supply being continued, the commander was enabled to report, by the end of August, "the timely supply of guanaco meat had certainly checked the scurvy." This is an instance in which articles of diet having recognized antiscorbutic properties proved insufficient, in the absence of lime-juice and fresh meat, and under conditions of exceptional hardship, exposure, and depressing influence, to prevent the occurrence of scurvy. So with the Eira, we believe that had they not fortunately been able to obtain abundant supplies of fresh meat, scurvy would have appeared, and that the preserved vegetables, in the absence of lime-juice, would have proved insufficient as anti-scorbutics. This antiscorbutic virtue of fresh meat has long been recognized by Arctic explorers, and, strangely, their experience in this respect is quite at variance with ours in Europe. It has been sought to explain the immunity from the disease of the Esquimaux, who live almost exclusively on seal and walrus flesh during the winter months, by maintaining that the protection is derived from the herbage extracted from the stomach of the reindeer they may kill. In view, however, of the small proportion of vegetable matter that would be thus obtained for each member of the tribe, and the intermittent nature of the supply, it can hardly be maintained that the antiscorbutic supplied in this way is sufficient unless there are other conditions tending in the same direction. And of these, one, as we have already stated, consists probably in the fact that the flesh is eaten without lactic acid decomposition having taken place, owing either to its being devoured

immediately, or from its becoming frozen. The converse being the case in Europe, where meat is hung some time after rigor mortis has passed off, and lactic acid develops to a considerable extent. This seems a rational explanation, and reconciles the discrepancy of opinion that exists between European and Arctic observers with regard to meat as an antiscorbutic. In bringing forward the claims of flesh of recently killed animals as an antiscorbutic, it must be understood that we fully uphold the doctrine that the exclusive cause of scurvy is due to the insufficient supply of fresh vegetable food, and that it can only be completely cured by their administration; but if the claims advanced with regard to the antiscorbutic qualities of recently slaughtered flesh be proved, then we have ascertained a fact which ought to be of the greatest practical value with regard to the conduct of exploring expeditions, and every effort should be made to obtain it. Everything, moreover, conducive to the improvement of the sailors' dietary, ought to receive serious consideration, and it has therefore seemed to us that the remarks of Mr. Neale and Dr. Lucas are especially worthy of attention, while we think the suggestion of the former gentleman with regard to the use of the blood of slaughtered animals likely to prove of special value.—*Editorial in Lancet.*

Iodoform as an Application to the Dental Pulp.—Hagelberg, D.S., Berlin, gives the method as follows: Under simultaneous action of a syrupy solution of colophonium in carbolic acid the carious matter is removed from the dental cavity, and the exposed pulp is carefully and gradually cauterized with the same solution, which requires one to two minutes and entirely relieves the pain, however intense it may have been during the previous manipulation. The cavity is then desiccated as much as possible, and iodoform, in powder or in ether solution, is applied directly upon the cauterized pulp; the cavity is immediately filled with gutta-percha after the usual manner.

During three months I have followed this method in forty-two cases; of these seventeen were molars, thirteen bicuspids, the rest incisors. Of these last some were filled with cement (pyro-phosphate) instead of the gutta-percha. Out of all these, two bicuspids only manifested pain after the treatment, which, however, was relieved by penciling with iodine; the other cases gave no further trouble.

As a result of this treatment I wish particularly to state that in no instance has it been necessary to use arsenic paste to cauterize the pulp, and I have therefore arrived at the conviction that the use of arsenic for that purpose is no longer necessary.—*Berlin Klin. Woch., Mo. Rev. Med. and Pharm.*

Nitrous Oxide.—Further experience has not changed the relative position or very much enlarged the sphere of action of nitrous oxide. That it is the safest of all anesthetics has been established beyond a question. In one institution where such administration is subject of record, gas has been given over 100,000 times, and not only without a death but without causing in a single instance symptoms sufficiently serious to necessitate transporting the patient home in a carriage.

In the city of Philadelphia alone, it has been given over 133,000 times without a death, and without any injurious results. Death cannot be justly attributed to it in more than four cases since its introduction. —*Holmes's Surgery, American Edition.*

Hydroa of the Mouth.—Hydroa, when it occurs in the mouth, may give rise to certain erroneous diagnoses—syphilis, for example —leading to energetic treatment which at best is useless. Dr. Quinquad (*Annales de Dermatologie*) has recently given a description of this affection, which may be of service in differential diagnosis. The affection is essentially superficial and varies according to the region which it attacks. On the lips it begins by an intense redness on the median line or on either side of this line. It hardly ever has its place in the commissures, which distinguishes it from the syphilides. The erythema is at first circumscribed, sometimes occupying the mucous membrane alone, sometimes the mucous membrane and the skin. The redness is like that of the cherry. Within the first thirty-six hours it manifests an opalescence similar to that of the syphilides; ulceration follows upon the ingestion of irritating viands, and gives rise to a slightly sanguinolent discharge. At this time the lips are covered with disseminated crusts, presenting here and there fissures. These brownish concretions circumscribe whitish, opalescent, humid spaces, which give place to vesicles. The same lesions may be met with on the inside of the lips, on the gums, where it resembles an ulcero-membranous stomatitis; on the tongue, where it simulates thrush, and on the palate. The eruption has three phases of evolution, an erythematous phase, which is very short: an erythemato-phlyctenoid phase, during which are produced the exudations; a phase of ulceration, which simulates the mucous patches of syphilis, and is followed by a period of repair. During all these stages pain is present. As a rule the eruption affects the mouth only when very intense and widespread. To this, however, there are some exceptions. The treatment consists chiefly in mild and astringent gargles.—*Chicago Med. Review.*

Mucous Patch.—The next patient, a young man, about twenty-five years of age, has been under treatment about six months for a papulo-squamous syphiloderm and mucous patches; the primary lesion having occurred about a year ago. We have not seen him for some time. As is usual in these cases, after the symptoms have disappeared under treatment, the patients regard themselves cured, and cease their visits. In this case the eruption has entirely disappeared, but he returns to us with a mucous patch, the size of a dime, irregular in outline, occupying the inner surface of the right side of the lower lip. It made its appearance three months ago, he says, and is continually increasing in size.

The treatment to be employed for mucous patches is the local application, by means of the camel's hair brush, of the acid nitrate of mercury, in the strength of one part to eight or ten of water: or a solution of nitrate of silver, ten or twenty grains to the ounce. Internally we will give him the protiodide of mercury in doses of one-sixth or one-fourth of a grain. The mercurial treatment should be continued for one or two years, and we always earnestly advise

this, though we know our advice may not be heeded.—*Clinic of Prof. Duhring, Med. and Surg. Reporter.*

Atropin for Dribbling from the Mouth.—Dr. G. F. Yeo says, in the *Lancet*, that often, in cases of paralysis, and sometimes in fracture of the skull, dribbling from the mouth is a most distressing symptom; it saturates the pillow and robs the poor patient of much needed sleep. A little atropin injected under the skin in the neighborhood of the gland, checks for hours the flow of saliva and enables the sufferer to enjoy a quiet sleep.—*Med. and Surg. Reporter.*

Inflamed Glands—Jaborandi Poultice.—Dr. Stetman, in the *Quarterly Proceedings of the Lancaster County Medical Society*, reports several cases of incipient inflammation of the mammary gland and of buboes, and in parotid swelling of mumps, where good results followed the application of a poultice made of one part of jaborandi leaves (softened by maceration with hot water) and two parts of flaxseed meal.—*Med. Times.*

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

What should be the treatment of fungous growth of the gums in cases like the following: The patient, a lady twenty-one years of age, came to my office with her teeth in a very bad condition; gums inflamed and swollen, I supposed from alveolar abscess. The teeth were extracted and carbolic mouth-washes used very freely. In about three weeks the patient returned and the gums were in a healthy condition; I then inserted a rubber plate. I heard nothing more from her until six months afterwards, when she returned and complained that a fungous growth had extended almost entirely over the alveolar ridge of the right side of the mouth, and to some extent over the membrane of the cheek on the same side. Other parts of the gums were in a healthy condition. I removed the growth with the knife and made a strong application of phénol sodique. In about three weeks it returned, when it was again removed and an application of nitrate of silver made. In about two weeks it again returned. If caused by wearing a rubber plate, why should one part of the gum be affected and the other remain in a healthy condition?—R. Y. H.

About six years since, a lady came to my office with a small cavity on the labial surface of a central incisor, partially under the free margin of the gum, which had very slightly receded from normal position. I filled the cavity with gold. Since then there has been an increasing discharge of pus, until the gum is eaten away in V-shape some distance above the filling. I have treated with tinct. iodine, saturate solution of salicylic acid, weak solution of carbolic acid, but all to no avail. At present the tooth is quite loose. I have used a fine scaler in search of foreign substance, but discovered none. Will some one who has had experience in this class of cases tell what treatment will cure?—C. S. W. B.

I WISH, through "Hints and Queries," to acknowledge my share of our indebtedness to Dr. Büttner, for his contribution toward the solution of the artificial crown problem. At the same time an account of my own method may not be entirely without interest to your readers. I find upon perusing the historical prelude of Dr. Büttner's essay that my method is really a combination of several methods, though of this I was not aware before. I very soon became disgusted with the different crowns set with amalgam or cement; in that each of these crystallizing substances is brittle and liable to break, especially when the quantity is small, as around a pin. The pin then is loose, and the operation must be re-performed. So gold alone remained as a reliable material, its ductility and tenacity, as we all know, making it especially useful in such small quantities.

After cleansing the canal and stopping the foramen, I enlarge cylindrically, and make retaining cuts where I am to need them. Then, in this enlarged canal, I insert a tube of gold, shaped like the frustum of an acute cone, save that the smaller aperture is made square,—having the larger end at the apex-end of the canal. Fill in around it with gold, and then carry the gold out over the exposed end of the root, building it down at least the thirty-second part of an inch. This surface is trued accurately, and a shoulder turned off from this gold end to fit a cap, having an edge turned up which has been prepared beforehand. This I have had to do in the try-and-try-again plan; but Dr. Büttner's "surface-truer" and trephine will make it much easier. In the center of the cap is a square opening of the size of the aperture of the tube now in the root. We have a second tube, square, and of the same size throughout, fitting accurately the opening in the cap and first tube. The relation of this to the cap we find by trial, and make permanent by solder. Insert temporarily this cap and tube to place, and the crown—a common plate-tooth—may be fitted, backed, and soldered to its place in the cap. Of course this crown should be fitted so that it will come above the cap, thus hiding the gold, in a front view. Split the upper end of the inner tube into four parts; separate them and spring into place. Then through the lower end of this tube, which is flush with the lower surface of the cap, soft gold is plugged until the tube is nearly full, thus dovetailing the inside tube into the first tube, which is dovetailed into the root. Then with annealed gold fill the small remainder of the tube and contour—the tooth backing having its edge rolled out for retaining grooves, in Dr. Webb's manner. Part of this contour work can be done before the insertion of the crown. The use of soft gold in the inner tube is advantageous in case of fracture of the crown, and the consequent necessity for removing the cap to replace the same. The method recommends itself by the absolute protection given to the root. In Dr. Büttner's method I fear that the turned shoulder in the root itself will bear some portions unprotected, as many of the roots are quite flat and a circular cap would either project on two opposite sides, or bear two opposise sides unprotected, or both, thus:

In my method the gold, built into the end of the root, can be brought down to the exact size necessary. I usually place a layer of foil, No. 12 or 20, between the cap and the gold end referred to to secure a perfect joint. I wish to say further that this crown is adapted to the oral teeth alone,—the crowns fastened with amalgam or cement answering very well where the occlusion is in line with the axis of the tooth. I am not a blind worshipper of the gold fetish, but prefer it in this operation on account of its strength.—JOHN S. FLAGG, M.D., D.D.S., *Winchester*, *Mass.*

IMPROVED SYSTEM OF RETAINING LARGE CONTOUR FILLINGS IN INCISORS,

AND FOR SUSTAINING AMALGAM AND GOLD CROWNS ON BICUSPIDS AND MOLARS.—I desire to present to the dental profession a new system (new to me) of retaining fillings in large cavities with frail walls or cavities that have little or no foundation for the fillings. The operation which I advocate should, I think, supersede the old screw system, because of its simplicity and its superior advantages. To illustrate, take a central incisor with the crown partly gone (Fig. 1,), the corner to be restored with gold. After applying the dam, prepare the cavity as usual, being particular to have the enamel edges as smooth as possible; then, with a small drill operated by the engine, drill a retaining-pit at the cervical edge as represented by the line *A*. Then drill a deep pit *B* in the cutting-edge portion of the remaining crown at an angle of 45° from a line of the root. Now, having the tooth prepared for the retainer, take a gold wire the size of the drill used, or somewhat smaller, and bend the wire as in Fig. 2, and, in inserting the retainer, place the end, *a*, into the cervical pit first; then by a slight compression of the horizontal portion, it will spring into the cutting-edge pit, the wire representing nearly the original contour of the tooth, but leaving a margin to build around, thus hiding every trace of it when the operation is completed. The wire will act as a guide in restoring the contour and when the filling is completed no amount of biting or mastication will dislodge it. The operation is simple, requiring no extra instruments, and is done much quicker than by the screw process.

FIG. 1.

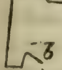


FIG. 2.

FIG. 4.

FIG. 3.

The same principle will apply to molars. Take a molar with crown entirely missing, only the roots remaining at a level of the gum, and after applying the rubber dam dress off the edges of the roots to a beveled surface; then with a suitable-sized drill make four holes in the roots at the four corners at an angle of about 45° from the root line (Fig. 3). Then select a suitable-sized platinum wire and make two retainers, (Fig. 4) and place one end into the hole prepared for it. Then, by pressing the other end down, it will spring into position. Set the two retainers in opposite corners so that the wires will cross each other in the center. The wires should come as near to the grinding-surface of the crown as possible, which can be determined by inserting the wires and testing the articulation when the wires are in position. Amalgam or gold may be packed securely around and over them, completely hiding them, and at the same time making a crown that will be much more solid than a porcelain crown.

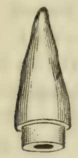
This is about the only method I know whereby amalgam can be used to advantage in restoring crowns of teeth. If a molar crown is but partly gone, one of these retainers, placed in a position where it would do the most good, would be sufficient. One might also do in bicuspid roots. By this method the dentist is saved the necessity of cutting away too much of the sound structure to get a retaining surface. The advantages of this plan are numerous—cheapness, simplicity, durability. It requires but little skill, and it is almost impossible for a filling to become loose from strain brought to bear upon it in mastication. As much can not be said of the screw method.—M. A. WEBB, *Marengo, Ill.*

"IMPROVED" ARTIFICIAL TOOTH CROWNS.—The simpler we can make any operation that is causing pain or discomfort to our patients the more successful we will be, and we should study and try to improve ways and means to that end. In the January number of the DENTAL COSMOS Dr. Büttner, of New York, gave

a history of artificial tooth-crowns and the modes of procedure with each, and each method from the time of the first operation seemed to have been performed with an idea to improvement over its predecessor. Any one reading that history will probably be struck with the crudeness of the first and for a long time the only method of setting crowns—that is, by wooden pivot. But improvements have been made and I believe there is opportunity for further improvement. Dr. Büttner gives a process for setting artificial crowns which is greatly superior to any of those previously practiced, and if the operation is performed with any degree of skill, there is a reasonable chance for success. But I desire to suggest an improvement of this method. He uses a gold band fitted over the end of the prepared root, which I would dispense with.

Have constructed an artificial crown, with an extension at the neck of porcelain to take the place of the gold band. Thus, Fig. 1 *A* shows the porcelain band which is in reality a part of the crown *B*. It is of course hollow and cylindrical, to fit over the end of the prepared root. The preparation of the root would be the same as in the process of Dr. Büttner, using his reamers, trephines, drills, etc. The crown should be hollow the same as the Bonwill crown. After the root has been prepared, fit the crown to it (using a crown the diameter of whose band exactly corresponds with the instrument used in preparing the root so that the fit will be perfect) and then set a platinum pin in the root with any material best suited to the purpose, letting the pin extend up into the hollow crown, the same as in the Bonwill method, and after the crown is forced into position fill in the crown with filling-material, thus completing the operation. Fig. 2 shows the root as prepared, with the crown to accompany it. My crown is simply a Bonwill crown with extension at the neck to slip over the end of the root. The advantages of this method are that no soldering and very little fitting is necessary; no gold being used makes it inexpensive, and the most favorable part of it is its simplicity. In strength it is equal to the Büttner, and with this advantage, that it will look more natural, as there will be no gold to show. If the gums should shrink away from the neck of the tooth, the porcelain neck would still present a natural appearance.—M. A. Webb, *Marengo*, *Ill.*

Fig. 1.



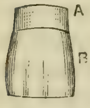


Fig. 2.

Some Experiments with Celluloid.—With the thermometer registering nearly 320° F. and a flask partially closed in the oven of my New-mode heater, my attention has occasionally, for a moment been diverted, and I have been startled to find upon returning to the business in hand that the temperature had suddenly risen even as high—in one instance—as 400° F. without apparent injury to the celluloid.

Having had experience with every other apparatus generally known to the profession, with uniformly disastrous results whenever the temperature much exceeded 220° F., this seemed to me phenomenal, and I report experiments recently made as being of interest and in some degree explanatory of the difference. To ascertain the difference, if any, between the degree of heat as registered by the thermometer of the New-mode heater and the actual temperature of the oven, I suspended therein a mercury tube of a Hayes vulcanizer so that its scale could be seen through the glass of the oven door. (The possibility of this difference was suggested from the result attending that one of the following experiments where *steam was suddenly admitted to the oven at* 320°). I then gradually raised the heat. The result was that the thermometers accurately coincided in the registry of heat.

To ascertain, "with dry heat," at what degree celluloid will spontaneously ignite, I placed on a clean slab of plaster in the cold, dry oven a small piece of it, and, closing the door, gradually raised the heat. Result,—When the thermometer registered 340° F. the celluloid began to swell and puff up, at the same time changing its pink color for one of a dull, grayish white, and at a temperature varying from 380° to 400° in different experiments it spontaneously ignited. To ascertain if celluloid will instantly ignite if subjected to so high a temperature, maintain the heat and substitute a fresh cold piece. The average time at which explosion occurs in this experiment is about at the expiration of the seventh minute. Celluloid subjected to steam heat, gradually increased from 220° F., ignites at about 300° F. If a piece of celluloid is placed in the oven, and steam at 320° F. is suddenly admitted, it will *instantly* ignite. Conclusion,—Celluloid in a steam chamber will not endure without injury a temperature much exceeding 220° F; it will not endure a temperature of 300° F. without exploding: therefore any apparatus designed for steam-heat is not well adapted for molding this base. As the temperature of the oven of every dry-heat apparatus (except the New-mode heater) is subject to sudden and unavoidable increase of heat, they are not well adapted for molding this base. The vast superiority of the New-mode heater depends principally upon the fact—which I have never yet seen stated—that the air of its oven, once superheated, is not displaced, remaining therefore nearly deprived of the elements necessary for combustion during the entire process of closing the flask.—FRANK W. LOW, *Attica, N. Y.*

ARTIFICIAL CROWNS.—I was very much interested in reading, in the January number of the DENTAL COSMOS, Dr. Büttner's summary of the various methods of attaching artificial crowns to natural roots. I have followed a method differing from all of them. If there is any merit in it the profession is welcome to it: A thin gold band, of about 26 or 27 plate gauge, is fitted to the root. If necessary, screws are fitted into the root-canal, which is then one-half or two-thirds filled with oxychloride or oxyphosphate cement. The rest of the filling is completed and the cusps formed with a suitable amalgam, which, partially amalgamating with the gold band, binds the whole together and makes a lasting crown. The operation is a plain and simple one.—NEY CHURCHMAN, *Portland, Oregon.*

MINERAL WOOL—IS THERE USE FOR IT IN DENTISTRY.—This new substance came under my notice not long ago, and I have experimented with it in connection with phosphate fillings as a capping, and also as a filling for roots; not long enough, however, to report results. It is pure white, and looks quite like cotton batting; is a great non-conductor, and as easily manipulated as ordinary cotton. It will not burn any more than glass, for it is nothing more nor less than glass spun into minute threads. It is used chiefly for packing, and its use is suggested in any place where it is desirable to keep out the cold or retain heats I merely give these suggestions, thinking that some of our experimenters may. take it up and ascertain if there is a practical place for it in dentistry.—FRANK B. DARBY, D.D.S., *Elmira, N. Y.*

SEVERAL months since I purchased for experimental purposes some raw gutta-percha. What I received was rolled in sheets thinner than such as business cards are printed on. I thought I saw in this an excellent non-conductor, as well as a convenient form of capping for exposed pulps and sensitive dentine, and in the numerous times that I have since used it I see no occasion to change my mind.

It may be combined with oxyphosphate, or used singly. My method is, after the dam is in place and the right-sized piece cut out with scissors, to swab out the cavity with chloroform on cotton; apply the gutta-percha, which will readily adapt itself with slight pressure to any unevenness. Fillings of gold or amalgam can readily be inserted over this capping, which is very indestructible in the fluids of the mouth.—C. S. W. B.

Experiments with Plaster of Paris.—Dr. Spence, in the experiments recorded in your issue for November, refers to the use of alum. In doing so, he is evidently unaware that the word alum applies to many different compound salts, and it is clear that his experiments were made with ammonia alum made from gas-works waste products. Alum, as properly understood, means the sulphate of alumina and potash, and this salt can be obtained by specifying and paying a fair price for it. Its action with plaster of Paris is totally different from that of ammonia alum, (sulphate of alumina and ammonia), which for some years past has been sold in the place of the potash salt, to which the name was originally given. A solution of potash alum, boiling hot, insteadof softening plaster, will make it so hard that it is difficult to cut or break, and it will cause plaster which has lost its power of setting totally to set again, although not sufficiently hard for use.

In addition to ammonia and potash alums, there are others, such as chrome alum, etc., which all go under the same title; it is therefore necessary in recording experiments to specify the salt used, to prevent errors.—Thos. Fletcher, *Warrington*, *England*.

Dr. Williams's articles on "Life and Vitality" are probably very learned and profound, but they remind me of a definition sometimes given of metaphysics; "When you see two men talking, and neither understands the other, and neither knows what he is talking about himself,—that is metaphysics." The doctor makes free use of the terms "subjective" and "objective," and no doubt these words may be made to express a real distinction; but when he tells us that life—the life of a plant, we will say—should be studied from its subjective as well as from its objective side, I think it would puzzle him to give any clear explanation of his meaning.

Another thing: The gentleman seems to have a strong dislike of materialists and their views. I do not profess to belong to that school, but they are entitled to a fair hearing and to fair judgment. I know something of their way of thinking, and I am sure there are materialists who, if Dr. Williams should meet them in argument, would give him quite enough to do to refute their "sophistries," shallow as he thinks they are. Materialists do not, more than does Dr. Williams himself, look upon chemical affinity and gravitation as entities. They regard them as manifestations of force, and they believe all force to be inherent in matter.—C. E. M.

A Suggestive Card.—I find the following card a very convenient reminder to my patients, especially to mothers of large families:

M..

Your teeth should be examined in ...., 188 , *or earlier if anything unfavorable is indicated.*

D. M. C., D.M.D.,
No. 85 *N. Street.*

B........................188 .

THE

DENTAL COSMOS.

VOL. XXV. PHILADELPHIA, APRIL, 1883. No. 4.

ORIGINAL COMMUNICATIONS.

ARTIFICIAL CROWNS.

BY JAMES E. DEXTER, M.D.S., NEW YORK, N. Y.

(Read before the First District Dental Society, State of New York.)

At our last meeting, as you may remember, it was promised to place before you to-night the whole subject of artificially replacing broken or lost tooth-crowns. But, upon gathering materials for this purpose, I found that any single paper which would comprehend the whole subject, however concise in treatment and expression, would be by far too long to read before the society at any one meeting. The subject, as stated, covers almost the whole of prosthetic dentistry, besides including some principal operations in the sister branch. Single teeth on pivots proper; aggregations of several teeth on a few roots on the pivot plan; banded or ferruled crowns, with or without pivots; metallic crowns formed outside the mouth; metallic crowns formed in place on the roots; porcelain facings or renewals, with or without pivots; porcelain replacements by filling into, or other methods of connection with adjoining natural teeth; such are some of the varieties of artificial crowns which would necessarily claim attention under the announced title of this paper, and to properly consider these and other variations of the subject (whose name is legion) would require a volume.

The term "pivot," as applied to the peg, tenon, or dowel used in the operation under review, is both incorrect and inappropriate; inasmuch as a pivot is, properly, a pointed center or bearing upon which something revolves or is balanced—a condition *not* exactly such as we usually desire to attain in setting an artificial crown. Also, and consequently, the word "pivoting" is not a proper descriptive term for such setting. But as, in this paper, it is not intended to alter dental terminology, and because the objectionable words

have been generally used in connection with this operation since the earliest times, and are fully understood by all to mean, in this connection, what they do not really mean, I shall use them, throughout this paper, according to their general acceptation with regard to artificial crown setting.

The operation of pivoting teeth is one of the oldest methods of replacing lost natural crowns. Indeed, like the famous hen and egg, it is somewhat difficult to decide whether the pivot-tooth or the plate came first in dental prosthesis. For more than one hundred and fifty years back we have notices or descriptions of pivot-teeth; and, at an early date, and even as lately as the first quarter of the present century, pivoting was deemed by far the best method of inserting artificial teeth in all circumstances which would admit of the operation. Robert Woofendale, in 1783, wrote that "Another method of supplying the loss of teeth by art is by fixing the crown or enameled part of a sound human tooth to the root of a tooth of which the enameled part is wholly, or in part, decayed or broken. * * * which may be done so completely that it is sometimes not without difficulty they can be separated, in some instances for several years, provided the orifice in the root of the tooth, through which the nerve passes, is not much decayed. This operation can only be performed where the teeth have but one root, neither can it be practiced when the root of a tooth is out."

The recorded history of pivot-teeth in this country, like that of all other dental operations, is very meager up to the time (1839) of the dental journals. It is extremely difficult—indeed, nearly impossible—to arrive at anything like certainty in determining priority of invention or introduction of any improvements before that date. Statements are occasionally made, in general terms, in the older authors, which seem authoritative as to principles; but we have only to turn the leaves of the next older book to find the same things quite as authoritatively claimed for the older writer; while he, in turn, must give way to others still before him, who probably, at the last, refer to the claimed novelties as matters of common use during and *before* their time, without hint of the real introducer. Thus, as we shall see later, a pivot-tooth patented in this country in 1849 is found accurately described and pictured in an old French work printed in 1807, and is noticed for years afterward by French writers as in ordinary use. As another instance, Benjamin James, writing in 1814, says, "Dentists pursue very different methods of fastening the new crown upon the roots; some drive the wire, which is attached to the crown, into the canal of the root, with cotton wrapped around it to make it tight; while others previously place a piece of wood in the root and attach the

crown to this substance." Mr. James himself preferred "screwing part of a gold or wood pivot into the crown (a natural tooth), and driving the other part, previously squared on its sides, into the wood socket already perforated for its reception and placed in the root." And Robert Woofendale (1783) tells how to unite a (natural) crown to a root "by filing each properly and uniting them by the assistance of a screw of gold or silver."

Here we have, not hinted at but fully described, the wire pivot, the wood pivot, cotton-wrapped pivots, square and round pivots, wood sockets in the roots, and crown and root drawn together by a screw: all described from sixty-eight to one hundred years ago, and nearly all of which have been described and claimed as original within the last thirty or forty years.

The older methods of pivoting need little description, for they are, in many cases, in use to-day. Of course a hundred years ago there were no porcelain pivot-crowns, nor have I been able to discover, in the short time since the last meeting, the time of introduction of these. Human teeth formed the crowns then, the pivots being driven, screwed, or wedged with cotton into the crowns, with a similar attachment to the roots. Indeed, until comparatively modern times, there is no especial record of any very great improvement in methods of pivoting.

But occasional hints seem to show the existence of great progress in pivoting during these times of darkness in publication. The *Dental News Letter* of April, 1849, describes a "drill for drilling the root in pivoting teeth," which is simply our ordinary fissure bur, the spiral turn of the leaves being intended to carry the chippings out of instead of into the canal. In the *Dental Recorder* for November, 1851, Dr. A. Hill recommends *locust wood* as vastly superior to hickory for pivots, and I am inclined to agree with him, for locust is fully as strong as hickory and much harder, and every farmer knows the value of a locust fence-post from its capability of enduring moisture without depreciation.

In the *Dental Recorder* of March, 1852, Dr. C. C. Allen records *his* method of fastening gold pivots into pivot-crowns by "firing" them in with jewelers' enamel. Just seventeen months afterward, Dr. Frank Fuller, of Portsmouth, New Hampshire, claims the same process as *his* own. Dr. Fuller also uses a *locust*-wood bushing in the root for his pivot. And further, Dr. Fuller, in the same publication (thirty years ago) describes the mode of fastening a metallic pivot to the porcelain crown by flowing solder through a hole in the palatal aspect of the crown upon the end of the pivot, just as we shall hereafter see described as a novelty no longer ago than last July.

In the *Dental News Letter* of January, 1853, Dr. A. T. Willard

describes a pivot counter-drill for facing and countersinking the ends of roots for pivot-teeth (Fig. 1). Dr. Willard fitted his crowns *inside* the rim of tooth-structure left by the countersink. He says he had used these drills for five years, which carries their initiation, by him, back to 1848. But what must have been his consternation upon being quietly told by the editors of the *American Journal of Dental Science* that his drills, *and method*, were in use by Dr. Lee, of Alabama, in 1831. These drills are the same as some used by Dr. Büttner in his really latest of all processes of crown-setting.

Fig. 1.

In 1853, Dr. S. D. Muse, of Mississippi, used these same counter-drills for a somewhat different purpose. He mounted his crown with a wood pivot, as usual, and, *placing amalgam in the countersink*, forced the root home, thus making a moisture-tight joint between the crown and root. This is the first record I have found of amalgam being used in pivoting, and it is also the first intimation of so placing a pivot-tooth as to secure a moisture-tight junction of the crown and root.

In the Dental Cosmos, vol. vii., p. 301, Dr. C. E. Latimer describes a method of pivoting by the use of Wood's or other fusible metal. A wire is screwed into the root, and an ordinary plain-rubber tooth ground to fit and held in place with the fingers, while the metal is worked over and around the projecting pivot and the tooth-pins, uniting the two and forming the palatal contour.

In November, 1863, Dr. J. H. McQuillen describes his method of setting pivot-teeth in decayed roots with oxychloride of zinc. He simply, after preparing the root properly, filled it with the cement, and pressing the pivot into the latter forced the crown to its seat, the surplus squeezing out at the joint. This is the first mention of this material for the purpose.

In the Dental Cosmos for October, 1868, Dr. M. L. Battle, of Georgia, describes a method of setting pivot-teeth with amalgam. He prepares the root by drilling, as usual, for a pivot, and forms retaining-pits or undercuts in the stump below the pivot-hole, reaming out the root if necessary to obtain space for this purpose. The pivot being in place is filled around in the root with amalgam, the stump being entirely capped over with that material. The crown is then placed over the pivot and forced on until of the same length as its natural neighbors, the surplus amalgam being squeezed out at the joint. This method is very like, in principle, some of the more modern ones.

The wood-bushed solid-gold pivot is described at length by Dr. J. D. White, in the Dental Cosmos for 1860; but it is very certain

that it was in use long before that time, as also the wood-bushed gold tube for pivoting. Of the latter there are specimens in Dr. Bronson's cabinet made many years ago for Dr. J. Smith Dodge.

Dr. C. C. Allen, in commenting upon Clark's patented pivot-tooth, in the *Dental Recorder*, vol. iii., p. 260, August, 1849, gives the first *recorded* description of the (now) ordinary screw-cut gold tube set in the root to receive a pivot (Fig. 2). He says, "We procure gold tubes of any desired length and of two different sizes, the smaller for the laterals and the larger for the centrals and the eye-teeth. These tubes must first be soldered securely the whole length, then a fine-threaded screw is to be cut on their outer surface. * * * * The root is then prepared by removing all the decay from the lower part and drilling the upper or sound part as deep as the fang will allow. A screw is then cut in the fang as high up as it has been drilled by passing into it two or three taps until a perfect thread is formed in the dentine. * * * * The tube is then screwed in as tight as it can be, * * * and cut off with a fine saw. The opening between the tube and the margin of the fang may now be securely filled with gold foil. * * * * It is then ready for the artificial crown, which may be set in any way the operator chooses, taking care not to infringe upon any person's patent-right. * * * * Those who prefer it can use platina tubes and a filling of amalgam. * * * In most cases, a tube may be inserted large enough to admit the wood pivot, * * * but we consider the gold pivot and a plate-tooth much better."

FIG. 2.

But this method Dr. Chapin A. Harris (*American Journal of Dental Science*, 1849, 1st series, vol. ix., page 378) claims, without describing it, as his own, as follows: "The procedure necessary for the insertion of a tooth in this way, we described, during a conversation with several professional friends, in the office of Dr. Jahial Parmly, of New York, some two or three years ago; and to every class of the Baltimore College of Dental Surgery, with the necessary illustrations, during every session for the last eight or nine years."

This carries the screwed gold tube back to about 1841, when its further origin or origins become lost in the mists of antiquity.

Mr. F. H. Clark, New York (Fig. 3), patented February 13, 1849, an appliance, a condensed version of the description of which, as given in the patent, may be as follows: an opening in the root of a truly cylindrical bore, is made to receive a gold cylinder, flanged at the gum end to retain a gold filling around it, and having a hemispherical bottom at the other. A hole through this bottom admits a screw having a head rounded on the side toward the thread, so that it will draw to its seat, when screwed through the cylinder into the root,

even if the two are not in exactly parallel directions. The screw is perforated lengthwise, to allow escape of pus or gases. The cylinder has a bar or projection soldered across one side on its inside; against which bar fits the square side of a round gold pivot, which fills the cylinder, and is split and spread to aid its hold on the bar.

FIG. 3.

Although patented, this appliance is a very old one. It is described and pictured in a work on dentistry by Maggiolo, of Nancy, France, published in 1807. Delabarre (1820), Desirabode, and other French writers also speak of it. Here we have an instance of the value of a patent as indicating priority of invention.

In 1855, John Coghlan, of Ireland, patented (in England) the use of a *tube* for a pivot, in place of the solid wire generally used. His idea was to secure an opening through the root and crown for the escape of the air crowded before the pivot in the ordinary method, as well as to allow pus and gases to escape, in case of subsequent "trouble." But Dr. Elliott, of this country, had "invented" the same tube before him, and had afterward found it to have been long in use in France. "So difficult is it to conceive an original, or at least a singular and original, idea on any known subject"—despairingly exclaims Mr. Perkins, in recording these circumstances.

Perhaps as good an illustration as any of the practice called "safety vent" in pivoting was described by Mr. Moon, before the Odontological Society of Great Britian, as follows: "Having extirpated the pulp and syringed out the root-canal, the bore of the latter is equalized to the depth of half an inch (or less, according to the length of the root), cylindrical bars (drills) of graduated sizes being used for this purpose. The root-barrel is then rifled with a small excavator, and a platinum tube is packed in with amalgam. The patency of the canal and the tube is insured by retaining a piece of pin-wire in them until the tube is fixed in place. The amalgam being set, an impression is taken, the exact direction of the tube being shown by inserting into it a piece of pin-wire. * * * The crown is affixed by a split gold pin, which may be narrowed in one direction if much vent is required."

The safety-vent practice is an old one, as shown in the cases of Drs. Coghlan and Elliott's tube pivot, which had descended from the French. While the practice, with us in America, has value for a temporary purpose only (as where it becomes necessary to mount the crown before curing the root), I understand it to be much used abroad, especially in England. I will venture to say that no reputable American dentist would permanently mount a crown upon any other than a healthy root.

The banded or ferruled pivot-teeth are the latest varieties introduced. In this method the band or ferrule is the prominent feature, and really the only novel one. Therefore I determined to discover, if possible, its origin. This I have traced back to a publication of Dr. Wm. H. Dwinelle's, in the *American Journal of Dental Science*, April, 1855, vol. v., 2d series, page 278. It is not there described as connected with pivot-teeth proper, but rather as a *shape* or mold into which to pack crystal gold for restoring broken or lost crowns. Thus it would properly come under the head of methods of artificial crown-replacement; but would not appear under the heading of pivot-teeth. Still, I have attached so much importance to demonstrating the origin of the ferrule (since it is connected with a method of pivoting lately become notorious) that I will insert Dr. Dwinelle's description, and illustrate it in Fig. 4. He backs a plate-tooth with gold, having fitted its labio-cervical edge to the ground or filed root. On this first backing he solders a horizontal piece of plate with a hole in it. He then goes on to say that he solders "*a band of gold*" to the edge of the backing "*so that it will correspond to the presenting outline of the root to be covered.*" The tooth is then fastened to the root by a screw passing through the horizontal plate into the dentine, and, a similar screw having been also placed in the dentine beyond the plate, gold is built around and upon the screws, plate, and backing until the *band is filled up*, thus making a gold crown with a porcelain face.

FIG. 4.

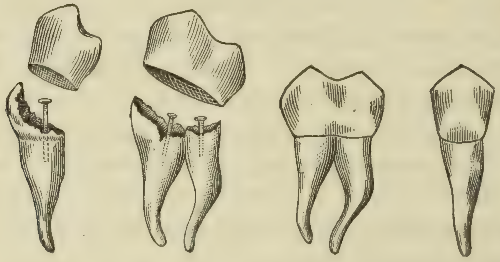
This publication undoubtedly establishes for Dr. Dwinelle the credit of origination of the *ferruled crown*. Dr. Dwinelle's work, however, was not in the direction of *pivot-teeth* proper.

The next claim to a band being fitted around a root, is found in vol. i., page 184, of the *Missouri Dental Journal*, May, 1869, over the signature of Dr. Wm. N. Morrison. In this publication he describes a gold crown, made by fitting a cap, struck up on a model of a natural tooth, its sides encircling the root and extending under the gum to the border of the alveolar process. A bar soldered across the inside of the cap afforded a holding-place for oxychloride of zinc, with which the cap was filled, and then pushed to its place on the root (previously prepared). Here no pegs, screws, or pivots were used; and hence, like the preceding, the operation does not come strictly under the head of "pivot-teeth." But it seems to be the primary record for *struck metallic caps* or *crowns*.

The first definite claim to a band being fitted around a root, *in pivoting teeth*, will be found in a patent, granted in 1873 to Dr. B. Beers, of California. Dr. Beers died in 1874, and his claim has, consequently, not received special attention. A description of his

method (shown in Fig. 5) is taken from a circular distributed by him to the profession in 1873, and reproduced in the Dental Cosmos for September, 1880, page 463. After taking an impression of the broken tooth or root, he says: "Take a strip of flat gold, and strike with a

Fig. 5.



punch in the center of it, into a piece of lead. This will give the front form of an incisor, lateral, or bicuspid. Then anneal the gold, and bend the two ends around the tooth requiring a crown; when properly fitted, solder the ends together. Then adjust the bite by hollowing out with a half-round file, so that it articulates properly with its antagonist. Then bend a piece of thick flat gold with half-round pliers to suit the form of tooth required, and solder securely on the top of the gold tooth and finish up."

Thus Dr. Beers formed his crowns. They were fastened to the roots by inserting headed screws into the canals, filling the gold crowns with some cement, (oxychloride of zinc), and forcing the crown over the root or broken tooth to place. Dr. Beers says, "In some cases it is not necessary to use the screws, as the gold crown fits so closely and firmly to the root that the cement is found quite sufficient." He does not seem to have been in the habit of specially dressing off his roots, or even of removing standing portions of broken crowns, but fitted the gold caps over the whole.

Fig. 6.

Dr. Eugene S. Talbot, in the Dental Cosmos, vol. xxii., p. 465, September, 1880, describes a modification of the Beers plan. It is shown in Fig. 6, and I condense its description. A band is made and fitted to the root, extending nearly to the alveolar process. Across this band, on the inside, and at a distance sufficient to leave a space over the root when the band is in position, is soldered a floor of gold, having holes to correspond with the pulp-canals beneath. These canals are drilled out to receive wires, which are placed loosely therein. The band under the floor is then filled with gutta-percha or a cement, and forced to place on the root, the wires projecting through the holes in the gold floor.

After cooling of the filling, the wires are removed, and their places taken by headed screws, which securely fasten the whole to the root. The crown may be completed by filling the band with gold, or a gold crown may be struck up and slipped either outside or inside the band, being cemented by gutta-percha or a cement.

In February, 1866, Dr. I. J. Wetherbee, of Boston, described a method of fitting tubes to plate-teeth, by cutting a groove between the (cross) pins, fitting a round or square tube therein, and soldering the tube to the backing and pins on each side; the contour to be formed by flowing gold upon the tube and backing. This antedates a claim for such grooved and tubed teeth, recently made by one who has been, and shall be, nameless in this paper; not, let me distinctly aver, from any prejudice, but because the claims made, and patents granted, are all so distinctly antedated that nothing remains for which their self-styled discoverer should receive notice.

In May, 1849, Henry Lawrence, of Philadelphia, was granted a patent for pivot-teeth. An abstract of the patent is as follows: "I make a headed screw of gold or other suitable metal, of a size sufficient to hold the pivot-tooth firmly. My tooth is of the same size and shape as the ordinary pivot-tooth, but with a hole entirely through, terminating in a countersink to receive the head of the screw. The tooth being fitted, and the canal of the root prepared to receive the screw, (screw the crown) firmly up against the root." The claim in the patent is for "a tooth with an aperture clear through it, terminating in a proper bearing for a screw-head."

Dr. S. Davis published in 1872, in the *Dental Times*, the following method (Fig. 7): The root is prepared as usual, and the chamber is reamed in a funnel shape, and anchorages cut in the sides of the reamed surface. A plate-tooth is ground to fit at the labio-cervical edge, backed with gold plate, and the sides of the tooth and backing are ground to bevel sharply inward, leaving the labial surface intact. A pivot is then soldered to the backing, and cut to such a length that, when in position, a narrow space will be left between the crown and root. The pin and backing are next pricked or roughened, some oxychloride is placed in the pulp-canal, and the crown is forced to place and retained until the cement has set. Gold is next packed into the anchorages and the pulp-chamber, around the pin, under the crown and up the backing, to form the proper contour.

FIG. 7.

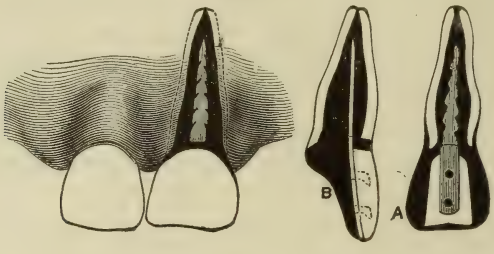
The late Dr. Marshall H. Webb has given us some methods of pivoting, of which the two following shall make my examples.

A heavy, narrow strip of gold backing is beveled on its sides *toward* the plate-tooth used, to which it is soldered. The backing

extends into the root, and gold is filled in around it and behind its beveled edges against the tooth, forming contour. The root, of course, has undercuts (DENTAL COSMOS, vol. xiv., page 583). (See Fig. 8.)

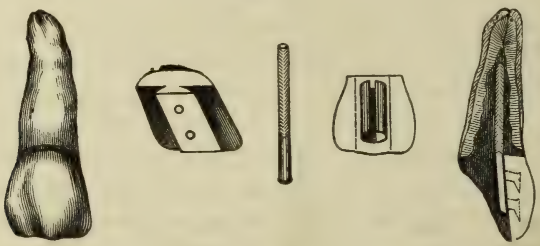
A plate-tooth with "straight" pins is backed with gold plate, the

FIG. 8.



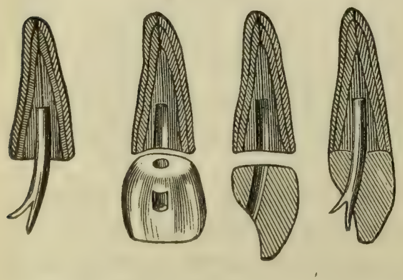
sides of which are so bent as to form the backing into a tube or cannula. Through this a gold pivot is slid into the root, and gold is filled in around the pivot in the root, and around the tube-backing, and into dovetailed slots in the crown. (DENTAL COSMOS, vol. xv., page 289.) (See Fig. 9.)

FIG. 9.



Dr. E. L. Hunter (*American Journal of Dental Science*, January, 1883, third series, vol. vi., page 406), gives the following: A pin of platinum-and-gold alloy has a thread cut on one end and screwed into the root; the other end being split. Several screws are now inserted in the face of the root, and gold is packed around them and the pivot, to cover the root-face. A pivot crown is fitted to this surface, the projecting split end of the pivot is sprung open, and the crown forced to its place, the cleft end of the pivot holding it firmly.

FIG. 10.



A variation of this process is that of Dr. G. P. Carman (DENTAL COSMOS, vol. xv., page 503), who uses an ordinary pivot-tooth with the hole drilled completely through it (Fig. 10). The split

end of his pivot loosely occupies the hole in the crown, and gold is packed around it, thus retaining the crown in place.

Dr. B. O. Doyle (*Dental Register of the West*, vol. xxvii., page 328), fastens a gold pivot into an ordinary pivot-tooth with shellac. The root-cavity is then partly filled with powdered shellac, and the crown and pivot, warmed sufficiently to melt the latter, are forced into position and held until the whole cools.

(To be continued.)

FIG. 3.

FIG. 4.

A NEW ARTIFICIAL TOOTH-CROWN.

BY W. STORER HOW, D.D.S.

THE difficulties and uncertainties in mounting artificial tooth-crowns on roots, by either old or new methods, led me to a careful study of the problem, and resulted in a nearly simultaneous devising of several new forms of crowns and appliances for setting them, as well as a perfected method of performing the operation of fixing a peculiar screw-post (Fig. 1) in a root, and also a novel process of attaching the crown to the post. At present I will describe simply the four-pin crown (Fig.

FIG. 1.

FIG. 2.

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8.

2), and the successive steps to be taken in mounting it, as demonstrated by me at the recent meeting of the Mississippi Valley Dental Association in Cincinnati:

1. When the root is in proper condition for mounting, measure the depth of the canal by means of the canal-plugger and its flexible gauge, (Fig. 3), and fill the canal at and a short distance from the apex of the root, keeping the gauge at position to show the full length of the canal and also the distance to which it has been filled.

2. Cut off the root-crown with excising forceps and a round file, down to the gum margin, and with barrel bur, No. 241, cut the labial part of the root fairly under the gum without wounding it.

3. Set gauge on a Gates drill (Fig. 4) to one-half the gauged depth of the canal, and drill to that depth.

4. Set the twist drill (Fig. 5) in its chuck to project the same length as the Gates drill, and drill the root to exactly that depth.

5. Enlarge the mouth of canal one-sixteenth of an inch deep all around to near the margin of the root, using square-end fissure-bur No 59, and then with oval, No. 94, under-cut a groove at sides and lingually, as shown in Fig. 6.

6. If the rubber dam is to be used for a gold or plastic backing, put it now over the root with Hunter's root clamp, also over the adjacent teeth, and thoroughly dry the canal.

FIG. 9.

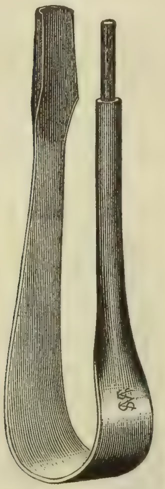


FIG. 10.

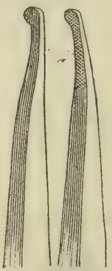


FIG. 11.

FIG. 12.

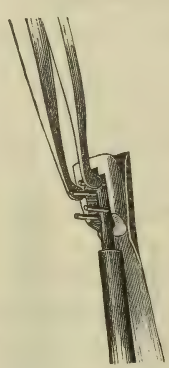


FIG. 13.

FIG. 14.

7. Set the tap (Fig. 7) in its chuck a trifle less in length than the drill, oil the tap and carefully tap the root to the gauge depth.

8. Insert the post (Fig. 8) in its chuck to the exact gauge of the tap, and turn the thumb-screw down hard on the end of the post, then screw the post into the root, release the thumb-screw, unscrew the chuck a half turn, bend the post until the chuck stands in center line with the adjoining teeth, and unscrew the chuck from the post.

9. Slit the rubber back from adjacent teeth, tucking the flaps out of the way, so that occlusion may be tried, and the post excised and ground off until the teeth close clear of the post.

10. Try the crown on the post, and with disk F grind the rib between the neck pins until the crown is labially flush with the root

margin, using the disk dry and cutting a little at a time until exactly flush.

11. Take the crown and place the mandrel (Fig. 9) between the pins just as the post is to be, and with the pliers (Fig. 10) bend the pins carefully over the mandrel, cutting off the pins if too long to be pinched in on the mandrel at the sides, observing that the pin nearest the cutting-edge is first to be bent (Fig. 11), and the opposite pin bent *below* it on the mandrel, and so with the others (Fig. 12).

12. Slip the crown over the post, try occlusion, and with the post-chuck bend the post until the crown is properly aligned with the teeth, then with a stump corundum wheel No. 3 grind the neck of the crown to a close labial fit with the root, fitting only the portion to be concealed by the gum, leaving narrow gaps at the sides to be filled by the backing between crown and root (Fig. 13).

FIG. 15.

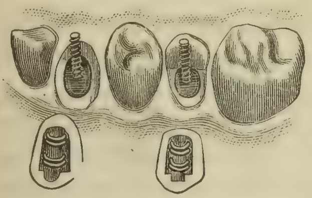
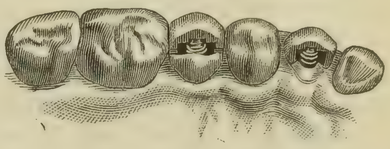


FIG. 16.



13. Grind cutting-edge for occlusion and relation to the other teeth, and be sure that opposing tooth does not strike crown, or post, or pins.

14. Fix the crown on the post by pinching the pins into the screw-threads in the post with the special pliers for that purpose.

15. Finally, pack the backing of gold, or cement, or amalgam, or Wood's metal,* or—for temporary backing while treating abscess—gutta-percha, into all the crevices around the post and behind and under the pins, and between the crown and the root; contour and finish thoroughly, so that no ledge or other imperfection can be found.

Figure 14 shows in vertical mid-section, an incisor crown mounted on a root; the blackened portions of the backing serving to define clearly the locking-hold of the backing on the screw-post, the crown-pins, and the root recess.

Figure 15 shows in perspective a cuspid crown ready to be slipped over its post, and also a cuspid crown ready for its post in the bicuspid root, which has its lingual cusp remaining, and Fig. 16 shows these crowns on their posts awaiting the completing or contour-backing.

* Wood's metal suggested by Prof. J. Taft.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting at the house of Dr. C. A. Woodward, January 16, 1883.

President, Dr. Safford G. Perry, in the chair.

Incidents of Office Practice.

Dr. Francis. I have just received a letter from Dr. E. C. Baxter, of Albany, stating an incident of practice. It seems an interesting case, and with your permission, Mr. President, I will read it:

"I have been much annoyed recently by one of my cases, and wish to know if you have ever been unfortunate enough to have a similar experience.

"Case: Lower second molar,—abscess discharging through fistula,—tooth quite loose.

"Treatment: Opened pulp-cavity, enlarged posterior nerve-canal, and drilled through foramen. Wrapped broach with cotton saturated with creasote, and forced through nerve-canal and out of fistula.

"Patient returned two days after, with no sensation between mental foramen and symphysis. Tooth was so loose I extracted it, and brought away cyst size of a bean. It has now been three weeks and no sensation has returned. Can run a pin through the lower lip, from the median line to mental foramen, and she would not be conscious of it. Motion is all correct. Physicians think that the sensation will return in time. Does it seem possible that so small an amount of creasote could paralyze the inferior maxillary nerve? I have never seen such a result before, and wish to know if any one else has been so unfortunate."

Dr. Francis. Dr. Baxter, as many of you know, is a skilled operator. As you understand by his letter he has had a peculiar case. He asks if any one has met with a similar experience; and I will ask if any gentleman present has ever heard of a similar result from the use of creasote?

The corresponding secretary read the following letter from Dr. E. A. Bogue:

39 Boulevard Haussmann, Paris, January 1, 1883.

Dear Mr. President, and Fellow-Laborers of the New York Odontological Society:

The exceedingly kind invitation that was extended to me last year to join you in a dinner that was given just after my return to America, and the very graceful manner in which our worthy presi-

dent worded his note, excited in me the deepest feelings of gratitude. You know the witty Frenchman's definition of gratitude was "a lively sense of favors to come," so as I feel myself stirred by that emotion, I am wondering whether I can better express it than by gossiping to you of what I see around me.

I have learned so much from our professional brethren on this side, and been so often astonished that I scarcely know where to begin. In point of time, perhaps I had better go back to the summer of 1881, and the Medical Congress in London. Dining at the house of Mr. Saunders, Dr. Brasseur, the secretary of the Odontological Society of France, was my right-hand neighbor, and Dr. Telschow, of Berlin, the now famous inventor, was at my left hand. These two gentlemen were friends, and both interested in a hydraulic press devised by Dr. Telschow for the purpose of stamping metallic plates for the mouth, so perfectly that even rubber or celluloid could not be fitted more accurately, if, indeed, they could as well.

To use this press, an impression is taken in the usual way with plaster or Stent's composition. Into the impression is poured the die of Spence's metal, which is mainly a sulphuret of iron, and melts at so low a degree, that it may be cast, by an expert, in the wax impression; but it is so hard, that it will allow of a gold plate being bent to fit it perfectly without being perceptibly bruised. This swage is put into the press, the gold plate is placed in position on it and a thick rubber disk is brought against the plate by means of the water pumped in beneath it, with a pressure of half a ton or more, gradually applied. The result, as before stated, is a fit which for accuracy surpasses anything that I have ever seen in that direction. I had no opportunity of investigating this press in London, but I have since, through the kindness of Dr. Brasseur, had the opportunity to examine his, and see the whole process in his laboratory.

Some of our New York brethren may remember that I have been making efforts during several years, to attach an apparatus to the dental engine which should provide the operator with a stream of heated air. Last December, just before leaving Paris, I showed my apparatus to Dr. Brasseur and explained to him the difficulties which stood in the way. He seemed considerably interested in the scheme, but I heard nothing from him until I again reached Paris. Judge of my delight when the doctor came in one day and presented to me a completed instrument, which has since been greatly improved, and accomplishes almost perfectly the desired results.

The instrument was made by a mathematical instrument-maker named Mouilleron, to whom our fellow-member, Dr. Du Bouchet, applied for a saliva ejector, having failed to get satisfaction with the

ordinary ones. This Mr. Mouilleron has brought out an instrument that is capable of drawing off oil or syrup from a containing vessel, the motive power being procured from water inclosed in two glass globes fastened together like an hour-glass, which only require to be turned over when the water is run out in order to act continuously.

Dr. Jenkins, of Dresden, called my attention to the electric light for illuminating the mouth, and as an aid in diagnosing obscure approximal cavities, and as almost a perfect means of diagnosing death of the pulp. I therefore went to see, and eventually purchased an accumulator and polyscope of Trouvé, by means of which I may have stored electricity available at any moment for examinations. However, I would advise you not to buy one until the reflectors have been much improved, for they are not as yet beyond the position of a scientific toy.

Mr. Saussine is now at work over the subject of stamping dental plates by the hydraulic press, and after hearing his explanation at the Chambres Syndicales, before the French Odontological, I was enabled through the kindness of Dr. Du Bouchet to meet this gentleman privately at the office of Mr. Poinsot, where I had the opportunity of seeing his hydraulic press stamp up two plates, and of listening to Mr. Saussine's intelligent explanation of his process. This consists in using D'Arey's metal as a counter-die over Spence's metal, D'Arey's metal melting at a still lower temperature than Spence's, so low, indeed, that in cases of overhanging jaws where the plate remains in the counter-die after swaging, the counter-die can be melted away from the gold, and the gold taken out without injury.

When we were through with the laboratory at Mr. Poinsot's, who, by the way, is a professor in the new dental school in Paris, he took us into his operating-room and showed us a small hydraulic engine with which he treats abscesses and cases of pyorrhea alveolaris. He also showed us his platinum cautery, kept hot by the combustion of "mineral essence" or naphtha, and an attachment to this same apparatus, by means of which he, too, gets a current of hot air. You will see from this that our professional brethren on this side are emulous of better things, and by no means stationary. Their school is creditable to its founders, and it seems to me they are trying through that channel to effect much-needed reforms.

Instead of being as with us, an outgrowth of the inner circle of the profession, this school has been established mainly by the influence of the workmen and apprentices, with the help of a few others; the Odontological Society having nothing to do with it. This latter body however is hoping for a school to be founded on a still broader basis and under State patronage, so that its diploma may rank with

the other diplomas of the great educational institutions of France. The Odontological Society of the Chambre Syndicale is also making an effort to have the practice of dentistry regulated by law, and if the measures proposed by the medical faculty are passed in the legislature, it would be almost as difficult for an American to obtain permission to practice in France, as it now is in England. But Drs. Andrieu, Brasseur, Gaillard and Coligny, are all interesting themselves in the framing of a law which shall be both protective and just, while Drs. Stevens and Du Bouchet and others play the rôle of censors, viewing the question from the foreigner's stand-point as much as possible. I am much in hopes that a beneficial law will be the result.

As I hope soon to have the pleasure of telling you all these things, I will bring my long letter to a close, with the hope that the society and all the members may enjoy a very happy and prosperous New Year.

E. A. Bogue.

The President, Dr. S. G. Perry, then read the following paper on "Preparing and Filling the Roots of Teeth."

Let me preface the few rambling remarks I have to make on the subject announced for the evening by saying that all my operations in and about the roots of teeth are conducted in accordance with a plan, or theory, which has been confirmed by long experience, and which I hold to with considerable tenacity. I refer to what I will call the "absolute-cleanliness plan." In the treatment of diseased roots I perform no operation and use no remedies that do not aid in bringing about a state of perfect cleanliness. Having done all in my power to secure this, if a healthful condition does not follow, I frankly confess to you I know of no other means by which it will be attained. Before describing my method of cleansing roots, which is very simple and may not interest you, let me "theorize" for a few moments—even at the risk of seeming to wander from the subject, and with the danger of advancing a thought which will not meet your approval—one, in fact, which does not altogether meet my own approval, and yet one that so often enters my mind that I give it to you for the little it may be worth. It is proverbial that to open a pulpless tooth of long standing from which the pulp has never been removed, and to fill promptly is to run the risk, within twenty-four to forty-eight hours, of lighting an inflammatory fire in the surrounding parts that may not always be readily extinguished. As you know, various answers have been given to the question, "why this sudden inflammation on opening a pulpless tooth?" For a long time my own

belief has been that the microscope can greatly assist in revealing the cause. There is not a gentleman present but knows that fetid odors from such a tooth are an indication of danger, and that thorough cleansing and disinfecting are essential before filling is permissible; while, on the other hand, an odorless tooth may be filled at once with considerable safety. Several years ago, while making some microscopic observations on the contents of pulpless teeth of long standing, I came to the conclusion that when fetid odors were present, bacteria would be found in incalculable numbers. My observations were not extended enough, nor of a character sufficiently exact to enable me to announce this as an undoubted scientific fact, yet they were extended enough to lead me to seriously consider the statement, and to induce me, in the absence of any other equally reasonable theory, to found upon it a system of treatment which, I assure you, in practice, has quite fulfilled its promise.

I will not undertake to claim that the elimination of fetid gases bears a certain relation to the evolution of microscopic life; yet, without absolute proof, I am inclined to believe this to be true. A quiescent pulp-chamber and canal opened, cleaned, and immediately closed, will often give rise to rapid inflammatory action, which would not have occurred if the canal had been cleaned and left open. What is more reasonable than to suppose that the sudden ingress of abundant oxygen rouses into rapid life the germs that have been dormant, or have sluggishly developed, and eliminates the gases which are either set free by the growth of the germs themselves, or by the chemical change of the contents of the canal which renders the life of the germs possible? After this abundant crop of germs have ripened and exhausted themselves, the tooth, being saturated with a germ-killer, can often be sealed with entire safety.

But the origin of these gases is a theoretical point incapable of demonstration, and one perhaps, with which we are not vitally concerned. It is more important for us to know that the contents of an uncleaned pulp-chamber and canal, whether it be the remains of the dead pulp, or fluid infiltrations into it, afford conditions most favorable to the growth of microscopic organisms. At the temperature of the body the whole oral cavity is a luxuriant tropical pasture-ground for them, and you may be sure that in every sheltered place they fairly swarm! Even in a state of health the mucous surfaces afford a sufficient nidus for them, and not alone in the oral cavity is this true, but, beyond doubt, along the whole alimentary tract. It seems to me that you need look no further for the cause of a fetid breath, for when that exists the mucous surfaces are literally alive with them. You all know the feverish breath of persons whose tongues are furred with fungous growth—mostly leptothrix buccalis.

I could quote Beale to prove to you that the germs of bacteria are in the blood, and are ready to spring into life in any part of the body where a sheltered place is found. He found them in great numbers in the stagnant blood of aneurisms. If you eat at night a piece of slightly tainted chicken which is alive with bacteria, I will promise you a lively diarrhea the next morning, the watery, mucous discharges of which, under the microscope, will astonish you with the myriads of bacteria present. So lively are they that it is easy to believe that their presence along the intestinal tract creates the irritation that gives rise to the watery discharge. But in no other part of the body do they find such favorable conditions for growth as in the oral cavity, and in no other part of the oral cavity do they find such shelter as about the necks of the teeth, and under the margins of the gums. And here let me wander from the subject to say that I am inclined to believe that many of those cases which we see of inflamed gums, absorption of the alveolus, and loosening of the teeth, are due to the insidious presence of these and other persistent organisms. If such loosening is due to lack of tone, as we are often told, or to accumulations of tartar, as some contend, why do not all of the teeth loosen at about the same time? whereas we know that here and there a tooth loosens and drops out, while the others stand firm and strong. If due to accumulations of tartar, why do so many teeth come out absolutely free from that substance? But if we consider this destructive process as due to the insinuating presence of these organisms it is easy to believe that when they get a foot-hold, here and there under the gums, they will multiply, and slowly but surely work their fatal way to the ends of the roots themselves.

A disorganized pulp contains material as well suited for the propagation of bacteria as the tenderest spring-chicken. If this theory be true, what should be the first step in the treatment of devitalized teeth of long standing, or in the case of those just devitalized? Obviously, it must consist in cleansing thoroughly the pulp-chamber and the pulp-canal, as well as in cleansing operations about the apex of the roots of such teeth as have a diseased condition at that point. There is no more sheltered place than at the apex of a root where there exists that sluggishly abnormal condition which some have termed a latent abscess. There, if in any part of the body, do bacteria find themselves in green pastures and by the side of still waters,—in fact in a bacterian heaven. To drill boldly through the ends of such roots when rapid inflammation is beginning about them, and create a fresh wound, and to be able to use about the apex such remedies as destroy germ-life is, in my judgment, the best treatment such teeth can have. It will generally check the inflammation and abort an abscess.

If this theory be true, it is self-evident that after having cleansed

the roots, our next step is to fill them with some indestructible and non-porous substance, and to do it so thoroughly that there shall be no open spaces, which in time, through open communication at the apex with the circulating fluids of the body, or by infiltration, shall become minute stagnant cesspools, breeding bacteria, and consequently producing gases; or if you object to that statement, producing gases through the chemical changes that make the life of bacteria possible. If this theory be not true, it will be still held by most of you that this absolute care in cleansing and filling is essential to permanent success. Perhaps without having any theory about it at all, you will still believe this thoroughness essential, for you will know by your own experience that your most perfect operations of this kind have almost invariably been successes, and that where you have failed, some one thing or another has prevented you from attaining perfection in the operation. So that it comes to the same thing at last, and most of us will agree that the absolute-cleanliness plan is the correct one.

And yet perhaps not all, for there are earnest men of long experience who do not consider it necessary to fill roots so completely, and in some cases not at all even, unless it is to close the apex, and who, perhaps, do not think it necessary to use so much care in cleansing the pulp-canal. They fill with cotton or other loose material, evidently on the assumption that sooner or later the pericementum will become inflamed, and then, as the tooth must be opened and ventilated, such fillings are more easily removed from the roots. This they do, perhaps, unmindful of the fact that it may be the very porousness and looseness of the cotton which encourages infiltration, and which makes the opening of the tooth necessary. There are still other progressive operators who, in devitalizing pulps, amputate and remove the greater part, but leave the living portions in the canals, capping them in the expectation that they will live, and knowing that the best filling any canal can have is a living pulp. This practice may be justifiable in certain rare cases in the buccal roots of the superior molars, and the anterior roots of the lower molars, where the pulps are almost hair-like in size, but that such a practice should be seriously advocated in the case of the other roots is to me inconceivable. I cannot understand how, having gone so far in the removal of a pulp, one should stop and perform an operation that must, in the very nature of the case, be uncertain, when, by going a little further, and removing all of the pulp, and filling the canal, they would have performed one of the most certain operations in dentistry. If such part of the pulp lives, the gain is very slight, and if it dies, as sooner or later in most cases it will, the danger is very great, and I cannot but depart from the subject of the

evening to condemn such practice. It seems to me that if a pulp is worth destroying at all it is worth destroying well; and the dividing line between the living and the dead should be at that part of the canal which has the smallest diameter. Of course that point must be at the apex of each root.

I shall not hope to say anything on the subject of the preparation and the cleaning of roots that will greatly enlighten you. My method is first of all to get free access to the pulp-canal. This I do by cutting very freely through good tooth-structure, when such cutting is necessary, or by drilling through the crowns. As far as possible I endeavor to gain access to a root in a line with the direction of its length, avoiding the turning of angles, or of working under ledges of over-hanging dentine.

If the cavity of decay which has caused the loss of the pulp is on the posterior side of either of the superior molars, I fill it permanently in the usual way, and then drill a rather large hole through the great anterior fissure in the grinding surface, in such direction as to give me direct access to the palatal and buccal roots.

Having access to them in a line with their length it is very easy to drill, or ream them up to their extremities, if that be necessary—which it is not always by any means. Sometimes, instead of drilling from the grinding surface I go in diagonally from the buccal side, and still in such a way as to approach the roots in nearly a straight line. The lower molars, when decayed posteriorly, I drill from the grinding surface, though oftener, perhaps, from the buccal side. I have thought that the flattened canals of the anterior roots of the first and second molars can be more accurately reached by drilling diagonally from the buccal side, and a little anteriorly, than from the grinding surface, because the great fissures are too far back to enable one to reach the anterior root readily. If there are large fillings on the anterior approximal surfaces of these teeth I often remove them and enter the pulp-chamber through the cavity, rather than weaken the tooth by drilling a large hole in any other part of it. And here let me say that I make a pretty free opening, for I do not think the canals can otherwise be thoroughly treated to their extremities. The superior bicuspids I generally drill, if at all, through their grinding surfaces, but the lower bicuspids I often drill diagonally from the buccal side. The superior incisors I often drill from the palatal side, rather than enlarge a cavity so much on the approximal surface.

In preparing or enlarging the canals I am rather chary of drilling them out with the engine unless it be with a flexible drill. I prefer to ream them with a pointed flexible reamer. By this means there is no possible chance of going through the side of the root. These

reamers I have made of piano-wire, which is filed down to the desired shape—the very fine ones four-cornered, the larger three-cornered—and used without being heated or tempered. All my nerve-instruments I make from this wire and the temper is absolutely perfect. It is almost impossible to break them in the roots of teeth, no matter how fine they are made.

In removing pulps which are being devitalized there will generally be considerable persistent vitality as we approach the apex of the root. It is not my habit to apply the arsenical paste too near to the extremities of the roots. If the tooth is a lower one I apply the dam and having dried out the root, I drop into it enough wood creasote to fill it nearly to the pulp-chamber. Then, with a barbed nerve-instrument, I proceed as far as I can, without too much pain, to "pick up" the remnant of the pulp. Of course as fast as the vital part of the pulp is exposed to the creasote it is destroyed, and by careful and patient manipulation, the canal can soon be cleaned of living tissue down to the apex.

Generally this can be done in a few minutes, and in most cases, if care is used, without much pain. Such loose pieces of the torn pulp as cannot be withdrawn from the canal with the barbed point, can be coaxed out by the use of pointed rolls of bibulous paper, which, when plunged into the canal, take up by capillary attraction the blood and creasote and with them the torn, minute pieces of the pulp. I then inject into the canal a drop of water and after churning the contents with the barbed instrument absorb it with the pointed papers. This I repeat until the water comes away clean, and the delicate touch of the instrument in the canal and down to the apex tells me no more of the pulp-tissue is left. If I have reason to believe the foramen at the apex is very small, and there is no sensation to the touch of the fine instrument, which meets with resistance at the closed apex, and there is no bleeding, I proceed to fill the canal permanently in a manner soon to be described. If these conditions do not exist, and I think it best to defer filling till a later day, I place a roll of the pointed paper saturated with creasote or carbolic acid in the dry root, and fill the cavity of decay with wax, or with gutta-percha.

On no account would I let such a root be exposed so as to become filled with mucus or with food. All substances that favor putrefactive action, which also means microscopic life, should be excluded. This I do with religious care. If the tooth is an upper one, this method of treatment is not so easily applied, for we have to work against the force of gravitation. But by tipping the chair well back, and raising the chin of the patient, the teeth can be brought near a horizontal line, and the creasote for killing the remnant of the

nerve, and the water for cleansing the canal can be pumped into it without great difficulty.

In removing the contents of the canals of dead teeth of long standing, I employ essentially the same plan. Filling the canal with water, I churn it with the barbed instrument until the water becomes dirty. Removing this with the pointed papers, I fill with water and churn again, repeating this process until the water comes out clean. Then I disinfect with carbolic acid or creasote, applying it by means of one of the pointed papers, and covering by filling the cavity of decay with wax as a test filling. In many of these cases of dead teeth of long standing, I do not cleanse the cavity thoroughly at first to the apex, nor seal the cavity after the cleansing process, but leave it loosely filled with cotton for several days, when I repeat the cleansing process, and then fill with wax or gutta-percha. After several days have elapsed, if no pain or soreness is felt, I recleanse and venture to fill the root permanently. The crown I almost never fill permanently at this time, but let it go with a temporary filling for several weeks or months, and sometimes for a year. If such a tooth goes for a year without giving trouble, I have but little fear of its future.

The pointed papers are an invaluable adjunct in the treatment of all roots. They are made by cutting a piece of bibulous paper two inches square diagonally from corner to corner. Each half being rolled very tightly between the moist thumb and finger, gives a roll three inches long, and tapering to a sharp, hard, firm point at each end. Being cut in the middle, this gives two sharp rolls, each an inch and a half long, and well suited, in a dry state, to carry nearly to the apex of most roots. Having them made ready for use, much time is saved, and as they are handled only with the pliers, the fingers are not soiled as sometimes would be the case in rolling cotton on an offensive broach. Since Dr. Hodson drew my attention to their use, I have never been without them.

In considering the filling of roots I shall detain you but for a moment, though it is reasonable to suppose that this part of the subject interests you most; for my method has come to be so simple that a few words will describe it.

I think I may safely say I have not filled a root, or the deep part of a large cavity of decay, with gold, in fifteen years. During that time I have used nearly all the the substances that have been advocated, except gold. For a long time I used thin oxychloride of zinc carried to the apex on a shred of cotton. The disinfecting property of the oxychoride is in its favor, but it requires great care to get it to the apex, owing to the danger of clogging in the canal and confining the air. It makes a stopping which is difficult to remove, and I contend

that one of the first essentials in a material that shall combine all the necessary qualities of a perfect filling is that it shall be easily removed.

If I had a dead tooth and it commenced to be sore, I should not care to sit for an hour having a hard filling removed from the root, any more than I should care to have a hole drilled by guess through the alveolus to the apex.

For some time I used gutta-percha in small pieces rolled to a point and packed as well as possible in so small a canal. Then, later, I used gutta-percha dissolved in chloroform and carried, like the oxychloride, on a shred of cotton to the apex. With this I found some danger of clogging and confining the air, besides the need of hasty manipulation owing to the rapid evaporation of the chloroform, which made the operation a "mussy" one. For a long time I used pointed gold wire wrapped with the softest gutta-percha I could find, and then, when the use of gutta-percha dissolved in chloroform became general, I used gold wire dipped in a thick solution of it. This I found less "mussy" and by fitting the wire to reach the apex I could be quite sure of leaving no unfilled space. I have also used shellac warmed in a lamp and drawn out to a tapering point. These tapering cones I push into the dry canal, selecting them of as near the size of the canal as possible, and then saturate the cavity with alcohol which runs by capillary attraction up the canal and softens the shellac and insures a close fit. These slender spindles can be used satisfactorily in the hair-like canals that cannot be enlarged by reaming. I am indebted to an article by Mr. Chas. S. Tomes for the use of this material. But all the methods I have named have not given me as much satisfaction as the simple one I have hit upon, and which I will describe.

From the ordinary red base-plate gutta-percha I cut slender strips of different sizes, and warming them in the lamp roll them to a sharp point at one end between any two flat substances. Laying them on one of the flat surfaces of my operating case I generally roll them down to the desired taper and sharpness with an ivory paper cutter. I use the red base-plate in preference to any other form of gutta-percha, as it is tough and will roll out to a wonderfully slender point if it is not over-heated in warming. I keep a large number of these on hand and of all sizes and of all degrees of taper.

They can be made very slender, as you see. I use them in the following manner: selecting such a one as I think, in size and taper, will fit the root to be filled, and cutting it off at the base to about the right length, I fix it at the base on the point of a properly-shaped blunt instrument which has been warmed enough to become slightly imbedded in the base. It will adhere to the instrument and can be

entirely controlled. Into the clean canal which has been moistened with carbolic acid but wiped dry again, chloroform is carried to the apex with a shred of cotton rolled on a nerve-instrument. Enough is applied to pretty well fill the upper part of the canal. Before evaporation occurs the pointed roll of gutta-percha, which is cold and hard and stiff, is carried to its place in the canal, the chloroform, if used in excess, being forced back into the pulp-chamber.

I use but little chloroform, however, for the roll of gutta-percha is so nearly adjusted to the size of the canal that if none were used at all it would still fit pretty well; but not so well as by the use of a solvent, for you can see how the softening effect of the chloroform will enable you, by forcing the material more firmly to its place, to be sure of filling all inequalities in the canal. The roll must be plunged quickly through the chloroform to its place, for the slender point is so small that it will be softened and destroyed if there is an instant of delay. I have sometimes placed the gutta-percha in the root rather loosely and then applied the chloroform, letting it run around the filling to the apex by capillary attraction and then, in a moment, forcing the stopping more firmly to its place.

The gutta-percha softens quickly, and care must be taken not to force it through the foramen. If the foramen is of considerable size, special care must be taken in this respect. I have a few times dipped the spindle of gutta-percha in chloroform, and then plunged it to its place, the surface being softened just enough to insure a fit. Large openings in the ends of roots can be filled more accurately with these rolls of gutta-percha than by any other means I know of. The size of the opening in the end of the root can be determined by a nerve-instrument, the tip of which is bent at right-angles, and cut off till it passes through; or the size of the opening can be known by warming the end only of one of these long gutta-percha spindles (being sure to keep the body of it cold and stiff), and pushing it through the end of the root, when, on withdrawal, it will be found to have exactly conformed to the opening. By measuring the exact length of the root, which is easily done by means of the nerve-instrument bent at right angles, and which, after being passed through, can be made to catch on the end of the root, and the roll of gutta-percha being cut to this measurement will, when carried to its place, come just to the end of the root, and no further. If carried to its place without being rotated, it must fit and close the apex perfectly. Then the chloroform being used around the base of the filling it can, by a little pressure, be made to fit tightly, and with no chance of disturbing that part of it which is already fitted tightly at the apex.

If flattened roots are to be filled, the rolls of gutta-percha can be warmed and flattened and by the aid of the chloroform made to fit perfectly.

All of these fillings can be comparatively easily removed. Being rolled out of one continuous tough piece, if they were not more closely adapted by the chloroform, they could almost invariably be easily and cleanly pulled out entire. During the two years and a half I have used them I have never had occasion to remove one of them, but several which I put in the roots of teeth out of the mouth while experimenting with them, I have removed without great difficulty with a warmed barbed instrument, even where the chloroform had been used.

The use of the pointed papers suggested to me the use of some such pointed filling-material and after nearly three years' trial I am convinced that this material is the best and this method the simplest of any of which I have knowledge.

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular meeting on Tuesday, December 5, 1882, at 8 o'clock P. M., the Vice-President, Dr. Wm. T. LaRoche, in the chair.

At the call for "Incidents of Practice," Dr. C. F. W. Bödecker presented the following:

Dr. Bödecker. A few days ago Dr. W. T. LaRoche brought to my office a large single-rooted upper molar, which he had extracted a few minutes before because it had given the patient much trouble. Upon splitting it we discovered several islands of eburnification, and, in the middle of the pulp-canal a large mass of secondary dentine, which adhered in places to the walls of the pulp-canal, and had nearly severed the pulp, a small space only existing for the passage of that organ. The exterior of the root gave evidence of exostosis and chronic pericementitis. I to-day cut the pulp in sections, but have not had time to examine it thoroughly. It presents some singular features. In the apical portion of the pulp I found nothing but cicatricial connective tissue. As I progressed toward the pulp-chamber, bundles of fibrous connective tissue crossed one another in every direction, with here and there the remnants of healthy nerves, and one pretty large artery. In one place was an apparently healthy nerve-bundle, and, at a small distance away, a very large spiculum of bone, with one of its spokes almost in contact with the external perineurium of the nerve-bundle. The further I progressed from the apex, the less was there of cicatricial connective tissue and the more of normal basis-substance; until, at the coronal extremity

I observed a few odontoblasts and medullary elements, and a fair network of myxomatous tissue. It seems evident that this metamorphosis of the pulp was the result of the pericementitis.

Yesterday I removed a right superior third molar, the crown nearly gone from decay, and the pulp yet alive. From the lingual root projected a thread-like process, which appeared to be bone; but I cannot yet say whether it is actually an ossification of the nerve, blood-vessels and pulp-tissue, or an independent formation.

Dr. LaRoche. The history of the case first named by Dr. Bödecker is as follows: the patient is very nervous,—in fact, she seemed to me quite unstrung. For the last fifteen months she has been in this condition. The tooth had a small approximal filling of cement. I removed it, and found no pulp-exposure nor crowding from the filling. I never remove a tooth except upon what seem to me very good grounds; and, taking into consideration the facts of this lady's nervous condition, and that the tooth had been troubling her for a long time, I felt warranted in extraction. I understand that the patient's nervous condition is much improved since the operation.

Dr. J. F. P. Hodson. I have in hand a case of trouble with bicuspids which I should like to present. They are the first superior bicuspid on one side, the second on the other. Both are very loose and sore, showing chronic pericementitis. Pus oozes beside one of them. I opened over the outer root of the first bicuspid, along its length, and could find no alveolar process, the root being smooth and devoid of pericementum. The color of these teeth is excellent, and all my tests go to show that the pulps are alive. There is no tartar present in the mouth, nor any decay of these teeth. The other teeth are all in excellent condition. I would like to know the cause for this condition.

Dr. Clowes. Since it is not certainly known whether these pulps are devitalized or not, their death cannot be said to be the cause of the trouble. I once had a case of devitalization where appearances seemed to show living pulps. A general in the late war received a bullet in his cheek, which passed through the face from right to left, knocking out the upper molars of the right side. A considerable time after recovery from the injury, he experienced a severe pain in the face, and came to me. The teeth seemed in perfect condition, and looked so alive that I was much troubled to account for the pain. Finally I drilled into a tooth, and found the pulp dead. Its removal and the treatment of the tooth were followed by cessation of the trouble. But in two or three months it reappeared. I drilled another tooth, and found a dead pulp, which I removed. Again and again this thing happened, until I had removed the pulps from no less than eight teeth which appeared perfectly sound and alive. What

was the cause? Undoubtedly, the nervous shock caused by the bullet. I dissent from the statement that it was proper treatment to extract the tooth of Dr. LaRoche's patient. What was the cause of the trouble there? The little filling. This had produced irritation, whence came the pulp-stone, which made pressure on the pulp, and produced the pain. If there had been applied a little of that forbidden compound called arsenic and creasote, if the pulp had been killed and removed, and the tooth well filled, there would have been no nervous lady and no loss of teeth to report to us.

Dr. Bödecker. The advice we have just listened to is undoubtedly good, in cases where it can be applied. But here it would have been useless. The irritation, referred by Dr. Clowes to the filling, could not have proceeded from thence; for at that part was the only normal portion of the pulp. But the point of change in the pulp-tissue was at the apex, the furthest from the filling; showing an inflammatory process at that point, and not near the filling. It seems plain to me that the disturbance and pulp-irritation and change proceeded from the pericementitis. There was much calcareous deposit in the pulp-canal. The large central lump nearly filled the canal, leaving only two very narrow openings for the passage of pulp-tissue. The only cure for that tooth, it seems to me, was its removal.

Dr. Clowes. It makes little difference with such cases as to the point of irritation. Such cases can be cured only by removal of the pulp. A tooth that has given trouble for fifteen months needs arsenic. Even if it seems perfectly sound, that is the proper treatment.

Dr. Bödecker. I believe Dr. Clowes is right as to all cases where he can get to the apex and remove all the pulp. But I am positive that it would have been impossible to go past the secondary deposit and remove the pulp beyond.

Dr. N. W. Kingsley. We hear much of removing every portion of every dead pulp. I am satisfied that this is clear humbug. When Dr. Bödecker says he could not remove a little bit of dead pulp in the apex of that root, and that therefore it was not worth while to try the effect of removing the portion he could get at, and that the tooth must therefore be extracted,—I think he was humbugging himself, as others do who hold the doctrine that all the pulp must be removed. We all know very well that this is not done, in even one quarter of the cases of pulp-removal. I thoroughly agree with Dr. Clowes. I should have devitalized this pulp, removed all of it that I could remove, and filled the tooth. I would not have extracted it.

Dr. LaRoche. The patient has something to do with these cases. This one was in so nervous a condition, that I believe it would have

been impossible to have operated as has been proposed. Had it not been for that circumstance, I should have either applied arsenic, or drilled the alveolar process at the apex and treated the tooth there. A question to Dr. Clowes. How would you apply the arsenic to an undecayed tooth?

Dr. Clowes. Make a safety-pocket. You have heard of the safety-pocket? Make one, and place the medicine within. I am aware my friend Kingsley does not intend to wrong us, nor do I wish him to get wrong impressions. We may not be able to remove all of a certain pulp; but let us be sure we have removed all that we can. I had a case once which especially illustrates my point. A gentleman presented a tooth which had been very carefully and beautifully filled with gold to (as the operator thought) the very apex of the root. But, unfortunately for his fine operation, the root had a bend near the end, and from that bent part he had not removed the pulp. The result was an abscess. I removed it, disinfected the root, and there was a cure. A very small amount of dead pulp in a tooth is a pernicious thing.

Dr. Tenison. With what do you fill the root?

Dr. Clowes. With gutta-percha.

Dr. Tenison. Are you always able to carry it to the apex?

Dr. Clowes. Yes, sir.

Dr. Kingsley. That is, if you don't humbug yourself. You cannot be certain of that until the tooth is extracted.

Dr. Clowes. I know when a cure is effected; and that cannot be, so long as there is present any dead pulp. These dead pulps once nearly prevented my being a dentist at all. When I was about twenty years old, and had been studying three or four years, I was told by an oculist that I would certainly lose the sight in my left eye, as the optic nerve was becoming paralyzed; and that, in all probability, through sympathy, the sight of my right eye would follow. I was told to go home and grow blind. I went home to grow blind. A dentist of great celebrity had, about two years before, wedged some of my teeth in order to fill them. The irritation thus produced had killed the pulps in the two laterals. Now, after I had gone home to grow blind, an abscess came on one of these teeth. I had it extracted, and in about three weeks my eye was well. I cried, "Eureka!" I had made a discovery. I said, extraction will cure these evils of bad sight, neuralgias, etc., for they proceed from nerve-irritation. We knew little about pulp-treatment in those days, and I practiced for others what had been performed for myself. But after a time I became aware that it was not the dead *teeth*, but the *dead pulps* in the teeth, that caused the trouble. And now I do not lose any teeth from that cause. I save the worst old ulcerated roots.

Dr. Kingsley. That is a very beautiful story. I have one to tell, also. Thirty-two years ago an upper lateral was filled in my own mouth, where there was no exposure of the pulp. An abcesss afterward formed and discharged over its apex. After a time the abscess stopped, and the tooth has been well since, although the dead pulp was never removed. What is proved by these two stories? Anything you wish to prove. It takes more than one swallow, or two, to make a summer. It is certainly a safe course to remove, as far as possible, the dead pulp; but do not fret because a little may still be left. Nature is a powerful healer; and after we have done what we can, we may leave the rest to her.

Dr. Watkins. With what does Dr. Kingsley fill the pulp-canal?

Dr. Kingsley. With anything I can get into it tightly enough. I have tried everything that has ever been suggested, and see little difference in the results, so long as the filling is tight. About thirty years ago a splinter of wood was advocated as the very best thing for pulp-canals. I think it is very much better than passing a broach through the apex, and leaving it there, as we sometimes find has been done.

A Member. I would have removed the tooth in Dr. LaRoche's case, and filled and replanted it. I had a case in which I humbugged myself about removing the whole pulp. An abscess formed, I extracted, and filled the pulp-canal from the apex, replanted, and the case is perfectly successful.

Dr. Clowes. I had a similar case. A lady patient told me of a wonderful operation performed for her husband, who had had a lateral tooth extracted, filled, and replanted. The other day that gentleman came to me with the tooth in his hand, it having come out during mastication. I sent him away for a week or two; and when he came back, the socket was discharging, and the pulp of the central also was dead. The replanted tooth had caused a burrowing ulcer, which had killed the pulp in the central. Such operations should rarely be attempted.

Dr. Bödecker. I have on my records eight or nine cases of replantation. I have, I believe, but two failures among these. Some have been doing good service for five or six years. Still, I believe that replantation should be attempted only as a last resort.

Dr. Atkinson. When a tooth is extracted, a tissue has been broken up, and a new attachment must be formed (in replantation), which will possess a lower degree of vitality than the original one. In other words, scar-tissue will be formed. If an ulcer forms, that fact is, in itself, evidence of vitality sufficient to give hopes of saving the tooth. Remove all the tissue which has deteriorated beyond recov-

ery, leaving that portion which is in an embryonal condition, and nature will complete the work satisfactorily.

In regard to the case of Dr. LaRoche's. If the tooth was not elongated and had no antagonist, there would have been no deposit upon the cementum,—no exostosis. If the pulp was dead, I should have gone through the alveolar process,—or, in its absence, through the tooth. If there is healthy action in a tooth, do not destroy it. The source of irritation must have been at the apex. The hypertrophy of the cementum at that point shows a healthy action around the root. It has been said that pericementitis was present; if so, it was not the primary cause of the trouble. The primary cause would probably have been found in a loss of tone in the circulatory system. I do not attribute the trouble to the filling.

Dr. Kingsley was right in regard to the filling of roots. Every pulpless root must become encysted, like a musket-ball, or any other foreign substance, in the flesh, in order to be tolerated and retained with the surrounding tissues in a healthy condition. If the apex of the root becomes so encysted, I care not what the canal is filled with—,wood, gold, or dead pulp,—if the filling is completely sealed from the oxygen of the air. A fermentable substance cannot cause trouble in the absence of oxygen.

As to replantation, a majority of the cases known to me have been absolute failures. I have known none such teeth to remain long, except they were extracted by mistake and returned at once. In such cases I believe the pulp reunited. I had such a case,—the patient a brother of Dr. Geo. S. Allan. I believe the pulp reunited; but, if not, then the root must have become encysted.

In a case mentioned by Dr. Clowes, he thinks the passage of the rifle-ball cut off the nerves and blood-supply from the teeth that died successively. But he does not thus account for the teeth being painful. A tooth cannot be painful without nerve-supply.

As to Dr. Hodson's case, the treatment depends upon elongation of the tooth. If not elongated, bind it securely in position with ligatures, and treat through the wound made by injecting a ten-per-cent. solution of aqua regia into the tract of lost tissue, repeating twice a week. I have seen many cases of lost socket and living pulp returned to health by this treatment,—some including restoration of the alveolar process.

Dr. Tenison. I will describe at least one successful case of replantation,—the patient a gentleman about twenty years old, the tooth a dead upper lateral, not decayed, but projecting so as to raise the lip. I found a copious discharge from the palatal portion of the root, which was surrounded by extensive calcareous deposits. After failure of other treatment, I extracted the tooth, removed the cal-

careous deposit, and cleaned out and filled the pulp-cavity. I then washed out the socket with the solution of chloride of zinc which we use with the oxide in filling, replaced the tooth, and tied it in place for about four days. This was four years ago; and now, a new socket seems to have formed, and he has never had any trouble with the tooth, which is as firm as any in the mouth.

Dr. Atkinson. I am pleased to hear that any have had success in this operation. For myself I must repeat, I have never seen a pulpless tooth replanted with final success. At the Medical Congress in London, in 1880, Dr. Magitot made a statement, which appears to me to indicate pretty accurately the average success in replantation. He reported a number of cases of transplantation and replantation (mostly the latter) as successful; but, in answer to a question, acknowledged that there was a fistula over every root!

The society then adjourned.

James E. Dexter, *Secretary.*

Clinic.

Dr. F. H. Lee exhibited his "New-mode" heater, as arranged for work in his laboratory. A steam-gauge takes the place of the ordinary thermometer. The gauge has electrical attachments, which ring an alarm, according to the temperature desired, when the pressure has reached that point. This alarm may be placed in any desired position, as in the laboratory or the operating-room; thus leaving the operator free to occupy either during vulcanization, with certain control of the apparatus. The steam blow-off is arranged as a one-quarter-inch cock at the side of the boiler, with a pipe to the outside of the house; which, together, allow of quickly blowing off steam, and promptly freeing the house from its disagreeable odor.

A lady, unknown, presented, in her own mouth, a case of a right inferior bicuspid with the following history, as described by her: the tooth was filled with gold in 1869. This spring a gum-boil appeared over its root, small, and not painful. A dentist (address refused) removed the filling, and attempted to cure the abscess with a solution of carbolic acid on cotton. It failed, the abscess increasing. The dentist then used a stronger solution of the same medicine; and, immediately upon this application, the sensory nerves of the lower lip and chin were paralyzed, from the median line back to the tooth under treatment. The dentist put in a temporary filling, and the patient treated the tooth with gum-camphor, applied night and morning to the gum above the tooth. She attributed the cure of the abscess to the camphor. The paralysis still existed, although seeming now to be slowly becoming less. She wished to know if it had been caused by the carbolic acid.

Dr. V. H. Jackson said that carbolic acid will anesthetize tissues, upon continuous or strong application. The mental foramen is situated just anterior to the tooth treated. The application may have injured the nerve-trunk which passes through this foramen and supplies the soft tissues in the paralyzed region. The nerve-trunk is evidently recovering its tone, and sensation is consequently returning to the paralyzed portion of the face.

Dr. S. C. G. Watkins described two similar cases in his practice. He had used electricity for the paralysis, with success.

Dr. Tenison exhibited models of a case of irregularity, showing a temporary canine still in place on the left side of the mouth, the patient being twenty-seven years old. She came to Dr. Tenison ten years ago, (at the age of seventeen), desiring to have corrected an irregularity of the canine and lateral of the right side. The doctor wished to extract the left temporary canine, its permanent successor already showing a prominence in the roof of the mouth; but was not allowed to do so, the patient fearing permanent disfiguration. The temporary tooth was still in place, but much decayed, and was being pressed out of place by the permanent tooth, which was still unerupted. The doctor stated that he had, in this case, followed the ordinary teaching that a temporary tooth, when found undecayed and firmly set long after its successor should have appeared, must not be extracted, because of a doubt as to whether a permanent successor will follow. He held that he had made a mistake in not extracting when the case was first presented to him.

He then exhibited a patient showing a case of the same kind, differently treated. This patient showed, at fourteen years of age, all the temporary molars firmly in place, undecayed, and with all the permanent teeth of that age except the bicuspids. Dr. Tenison extracted the eight temporary molars (which were very firmly set), with the result that the bicuspids appeared in less than three months. He was perfectly aware that it would have been generally accepted as bad practice to extract those teeth; but he presumed the bicuspids were present, though hidden, because he could see no reason why they should be absent; and the result had, in this and many other similar cases, justified him in the method used.

Dr. Bödecker presented a case of restoration of crowns by Dr. Büttner's method,—six superior front teeth, and two inferior centrals. Some of the molars were built up with gold by Dr. Bödecker, and some absent were supplied by a plate. (The case is destined for future examination and illustration.)

W. D. Tenison,

Chairman Clin. Com.

CONFERENCE OF STATE BOARDS OF DENTAL EXAMINERS.

Pursuant to the call of the committee appointed last August, at Cincinnati, and published through circular letter to State Boards of Dental Examiners, and also in the January Number of the Dental Cosmos, the representatives of the State Boards of Dental Examiners or Censors, met at the office of Dr. A. O. Rawls, Lexington, Kentucky, February 20, 1883, at 2 p.m.

The following States were represented:

Illinois, by Drs. Geo. H. Cushing and A. W. Harlan.

Indiana, by Dr. P. G. C. Hunt.

Kentucky, by Dr. A. O. Rawls.

New York, by Dr. Norman W. Kingsley.

Ohio, by Drs. J. Taft, H. A. Smith, F. H. Rehwinkel.

Vermont, by Dr. James Lewis, of Burlington.

After a short statement by the chairman of the committee of the object of the meeting, Dr. Taft was elected chairman, and Dr. Cushing secretary of this conference meeting.

Drs. Oliver D. Swain, of Chicago, and W. M. Herriott, of Indianapolis, who were present as visitors, were invited to participate in the proceedings.

After some interchange of views, experiences, and opinions, in an informal way, upon motion a committee of three, consisting of Drs. Rawls, Harlan, and Rehwinkel was appointed to prepare a programme for the order of business. This committee recommended that proper steps be taken to organize an association of the different State boards upon a more permanent basis. It further recommended a comparison of the different State laws regulating the practice of dentistry, to mark the defects and weak points of some, and the strong points and desirable features of others.

After a full and lengthy discussion, and free expression of opinion concerning the different State laws, Dr. Cushing moved the appointment of a special committee of three, to formulate and draft such a dental law as in the judgment of this committee would best promote the objects in view. The chairman appointed Drs. Cushing, Kingsley, and Smith, and requested a report as early as possible.

As a result of an extended discussion of the differing features of various State enactments, it became apparent that Illinois, Indiana, Iowa, and New York have thus far the most effective and comprehensive dental laws. Any State law without the registration clause is deficient in one of the most essential features. It was also deemed a preferable method to have the appointments for members of the examining boards made by the Governors of the States, to be chosen from nominations made by the State societies. This method would

make the boards State institutions, and the members thereof State officers. It was claimed that the law itself would gain in dignity and power and would be more certain of enforcement.

After a short recess the conference re-assembled at 7½ P.M.

The question of recognizing certificates of qualification or licenses issued by State boards as legal in other States received due consideration. It was found that none of the existing laws authorize such a proceeding; they do not even recognize a continuance of this kind; but, on the contrary, several States positively prohibit it. This question was therefore deemed beyond the jurisdiction of this conference or of examining boards, and must remain just as the laws provide.

The next thing for consideration was the question of the adoption of a more uniform standard of qualification. The discussion of this in many respects intricate question brought forth many laughable and amusing incidents, which occurred during the earlier examinations of applicants for licenses or certificates. The conference was a unit on the proposition that the time has now arrived when the standard of qualification should be raised so as to be equal to the examinations of the dental colleges for graduation.

With a view of bringing this question down to a practical point, Drs. Taft, Rawls, and Harlan were appointed a special committee to prepare and submit to this conference a series of questions in the several departments of dental science, which would embody the views of this conference as to their scope, and which might be suggestive to examining boards of the different States.

The hour being late, an adjournment until Wednesday morning at 10 o'clock was agreed upon.

Pursuant to adjournment, the conference re-assembled at 10 o'clock, Wednesday morning. After reading minutes of preceding meetings, the chair appointed Drs. Rehwinkel, Lewis, and Kingsley a committee on permanent organization.

The committee on drafting dental law submitted the following report, which was accepted; the several sections of the proposed law were discussed and voted upon—for or against approval.

PROPOSED DENTAL LAW.

SECTION. 1. Be it enacted by the people of the State of———, represented in the General Assembly: that it shall be unlawful for any person who is not at the time of the passage of this act engaged in the practice of dentistry in this State to commence such practice, unless he shall have obtained a license as hereinafter provided.

SEC. 2. A board of examiners, to consist of five practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act. The members of said board shall be appointed by the Governor from

ten (10) names, which shall be furnished him by the——State Society. Three members of this board at least, shall be members of the State society. The term for which the members of said board shall hold their offices shall be five years, *except* that the members of the board first to be appointed under this act shall hold their offices for the terms of one, two, three, four, and five years respectively, and until their successors shall be duly appointed. In case of vacancy occurring in said board, such vacancy shall be filled by the Governor, from the nominations of the State society.

SEC. 3. Said board shall choose one of its members president, and one the secretary thereof, and it shall meet at least once in each year, and as much oftener and at such times and places, as it may deem necessary. A majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

SEC. 4. It shall be the duty of every person who is engaged in the practice of dentistry in this State, within six months from the date of the passage of this act, to cause his or her name and residence or place of business to be registered with said board of examiners, who shall keep a book for that purpose: and every person who shall so register with said board as a practitioner of dentistry, may continue to practice the same as such, without incurring any of the liabilities or penalties provided in this act. The board of examiners shall furnish to the county clerks a certified list of those registered and it shall be the duty of the county clerks to register such names in a book kept for such purpose. Every person registering with the board of examiners shall pay as a fee therefor the sum of one dollar.

SEC. 5. Any and all persons who shall so desire may appear before said board at any of its regular meetings and be examined with reference to their knowledge and skill in dental surgery, and if the examination of any such person or persons shall prove satisfactory to said board, the board of examiners shall issue to such persons as they shall find from such examination to possess the requisite qualifications, a license to practice dentistry in accordance with the provisions of this act. But said board shall at all times issue a license to any regular graduate of any reputable dental college without examination, upon the payment by such graduate to the said board of a fee of one dollar. All licenses issued by said board shall be signed by the members thereof and be attested by its president and secretary; and such license shall be *prima facie* evidence of the right of the holder to practice dentistry in the State of ——.

SEC. 6. Any person who shall violate any of the provisions of this act shall be liable to prosecution, before any court of competent jurisdiction, upon information or by indictment, and upon conviction may be fined not less than fifty dollars, nor more than two hundred dollars, for each and every offense. All fines recovered under this act shall be paid into the common school fund of the county in which conviction takes place.

SEC. 7. In order to provide the means for carrying out and maintaining the provisions of this act, the said board of examiners may charge each person, applying to or appearing before them for examination for license to practice dentistry, a fee of ten dollars, and out of the funds coming into possession of the board from the fees so charged, the members of said board may receive as compensation the sum of five dollars for each day actually engaged in the duties of their office, and all legitimate and necessary expenses incurred in attending the meetings of said board. Said expenses shall be paid from the fees and penalties received by the board under the provision of this act; and no part of the salary or other expenses of the board shall ever be paid out of the State treasury. All moneys

received in excess of said per diem allowance and other expenses above provided for shall be held by the secretary of said board as a special fund for meeting the expenses of said board, he giving such bond as the board shall from time to time direct. And said board shall make an annual report of its proceedings to the Governor by the fifteenth of December of each year, together with an account of all moneys received and disbursed by them pursuant to this act.

SEC. 8. Any person who shall be licensed by said board to practice dentistry shall cause his or her license to be registered with the county clerk of any county or counties in which such persons may desire to engage in the practice of dentistry, and the county clerks of the several counties in this State shall charge for registering such license a fee of twenty-five cents for each registration. Any failure, neglect, or refusal on the part of any person holding such license to register the same with the county clerk as above directed for a period of six months shall work a forfeiture of the license, and no license, when once forfeited, shall be restored, except upon the payment to the said board of examiners of the sum of twenty-five dollars, as a penalty for such neglect, failure, or refusal.

SEC. 9. Any person who shall knowingly and falsely claim or pretend to have or hold a certificate of qualification, license, diploma, or degree, granted by any society, organized under and pursuant to the provisions of this act, or who shall falsely and with intent to deceive the public, claim or pretend to be a graduate from any incorporated dental college, not being such graduate, shall be deemed guilty of a misdemeanor.

All of the foregoing nine sections of the proposed draft, were one by one considered and approved.

The committee on permanent organization reported as follows:

Having taken the subject into due consideration, your committee respectfully recommends that a permanent organization of the examining boards be effected, and that Dr. Cushing, secretary of this conference, be instructed to notify the different State boards, and to urge them either to attend in a body or to send representatives to a meeting to be held at the Cataract House, Niagara Falls, on Monday, August 6, 1883, at 2 o'clock P.M. The time fixed for this meeting is the Monday preceding the annual meeting of the American Dental Association.

Dr. Cushing offered the following, which was unanimously adopted as expressive of the sentiment of the conference.

In presenting this draft of a dental law, this conference would say: That it is the result of consultations with those having had more or less experience in procuring such laws and in the working thereof. It embraces the principal features which experience has demonstrated to be essential. It is offered suggestively and not with the expectation that its phraseology will necessarily be adopted, or that it is the best, or most desirable. Of course, each State seeking to secure such a law would do so under the direction of its own legal adviser; but we believe the features of most importance are embodied in the draft submitted.

The committee on preparing lists of questions, being now called upon for a report, stated that there had not been time enough to complete its labor, but submitted the lists so far as they were ready.

The result being every way satisfactory, it was agreed that the committee should complete its labor and furnish the secretary with the lists for printing.

The business of the conference now being finished as far as could be at this time, after a hearty vote of thanks to Dr. Rawls, the resident member, for his unremitting attention and solicitude for the comfort and pleasure of those present, the conference finally adjourned.

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Although there were not as many States represented as was hoped for and anticipated, which was no doubt partly due to the terrible inundation of the Ohio Valley, which deterred some of the representatives from being present, the result of the meeting was in every way highly satisfactory, and it is thought that a foundation has been laid for an organization which will have in its power the accomplishment of much good. Letters were received from several boards, expressing their regret that their boards could not participate in this meeting, but indicating their sympathy with the object, and promising future co-operation.

On Wednesday evening, at the rooms of Dr. Rawls, the committee with a number of prominent Lexingtonians, sat down to an elegant farewell banquet.

ROENOOK.

NEBRASKA STATE DENTAL SOCIETY.

THE sixth annual meeting of the Nebraska State Dental Society convened at Omaha, September 12, 1882.

The following officers were chosen for 1882-3: Dr. S. H. King, president; Dr. I. W. Funck, vice-president; Dr. A. P. Johnson, corresponding secretary; Dr. W. F. Roseman, secretary and treasurer. The standing committees are Drs. A. S. Billings, J. W. Chadduck, and I. W. Funck, executive; Drs. J. J. Willey, C. H. Paul, and Allen Fones, membership; Drs. W. F. Roseman, L. S. Moore, and A. W. Nason, publication.

Resolutions were reported and passed in reference to the death of the late president of the society, Dr. D. A. Vance. The resolutions regretted the loss to the society and to the dental profession of a valuable member and an exemplary man, and tendered sympathy to his bereaved family.

After a profitable session of two days, the society adjourned to meet at Lincoln on the third Tuesday in May, 1883.

W. F. ROSEMAN, *Secretary*, Fremont.

ILLINOIS STATE DENTAL SOCIETY.

The nineteenth annual meeting of the Illinois State Dental Society will be held at Decatur, commencing Tuesday, May 8, 1883. Members of the profession in other States are cordially invited to be present.

C. A. Kitchen, *of the Executive Committee*,
Rockford, Ill.

GEORGIA STATE DENTAL SOCIETY.

By order of the president and the approval of the executive committee, the next annual meeting of the Georgia State Dental Society has been changed from May, 1883, to the second Monday in August, 1883, to join with the Southern Dental Association, at Atlanta, Ga.

L. D. Carpenter, *Corresponding Secretary*,
Atlanta, Ga.

ALABAMA DENTAL ASSOCIATION.

The fourth annual meeting of the Alabama Dental Association will be held in McDonald's Opera House, at Montgomery, Ala., commencing Tuesday, April 10, 1883, at 10 o'clock A.M., and continuing three days. The executive committee would respectfully request a full attendance of not only the members, but all in the profession, as they are anticipating a very interesting meeting.

E. Wagner, *Secretary*,
Montgomery, Ala.

The State board of dental examiners will meet at the same time and place, and all applicants for license to practice dentistry in the State of Alabama are requested to report promptly on the first day of the session.

T. M. Allen, *Secretary Board of Examiners*,
Eufaula, Ala.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

The annual meeting of the Dental Society of the State of New York will be held at Albany, June 12, 1883. Members of the profession who purpose appearing before the board of censors for examination for the diploma of this society and the degree of M.D.S., should immediately communicate their intention to Dr. Frank French, secretary of the board, at Rochester, and report to him personally the morning of May 8, 1883, at the Delevan House, Albany. The examinations will begin at 10 A.M. and continue throughout the day or until the list is exhausted. No examinations will be held during the sessions of the society.

J. Edw. Line, *Secretary*.

MINNEAPOLIS DENTAL SOCIETY.

The Minneapolis (Minnesota) Dental Society at a recent meeting elected the following officers to serve for the ensuing six months: Dr. T. A. Smith, president; Dr. W. A. Spaulding, vice-president; Dr. E. F. Clark, secretary; and Dr. W. A. Murray, treasurer.

J. H. Martindale, *Secretary*,
Minneapolis, Minn.

IOWA STATE BOARD OF DENTAL EXAMINERS.

The first regular meeting of the Iowa State Board of Dental Examiners will be held at Iowa City, Iowa, commencing on Monday, April 30, 1883. All temporary licenses expire at this date. Persons holding the above, together with any who have not registered and desire to practice dentistry in the State, must appear for examination for license at 10 A.M. on the first day of the session.

E. E. Hughes, *Secretary*,
Newton, Iowa.

BALTIMORE COLLEGE OF DENTAL SURGERY.

The forty-third annual commencement of the Baltimore College of Dental Surgery was held at Ford's Opera House, Baltimore, Md., on Thursday, March 8, 1883, at 2 o'clock P.M.

The address to the class was delivered by Rev. Dr. Hiram McCallister, and the valedictory address by Louis H. Rambo, D.D.S.

The number of matriculates for the session was eighty-nine.

The degree of D.D.S. was conferred on the following graduates by Professor R. B. Winder, dean of the faculty:

NAME.	RESIDENCE.
A. D. Barrett	Virginia.
A. J. Bercier	Louisiana.
J. C. Brewer	Georgia.
Henry W. Canada	Virginia.
Oscar Redd Colbert	Virginia.
James B. Cone	Georgia.
F. A. Coney	Pennsylvania.
J. T. Dashiell	Maryland.
Maurice Dawson	Virginia.
Daniel Dwyer	Connecticut.
Geo. Johnson Ford	Georgia.
W. Harry Frey	West Virginia.
Juan Piosa y Gonzalez	Spain.
Clifford H. Griebel	New York.
Sidney Perry Hilliard	North Carolina.
Thomas O. Hills, Jr.	District Columbia.
John L. Hitchcock	Connecticut.
William M. Horton	Alabama.
Theo. Johnson	South Carolina.
George H. Jones	England.
John E. Matthews	North Carolina.
Walter D. Moses	South Carolina.
W. W. Moss	Virginia.
George H. Oliver	Virginia.
G. B. Patrick	South Carolina.
Eugene Palmer	New York.
Delos Palmer	New York.
H. L. Pearson	Alabama.
Louis H. Rambo	Alabama.
John F. Reed	Virginia.
E. B. Robbins	Mississippi.
H. G. Saunders	Louisiana.
Charles S. Seebold	Pennsylvania.
John T. Skilling	Maryland.
Eugene Vigneron	Illinois.
J. Herbert White	North Carolina.

OHIO COLLEGE OF DENTAL SURGERY.

The thirty-seventh annual commencement of the Ohio College of Dental Surgery was held at College Hall, Cincinnati, on Wednesday evening, March 7, 1883, at eight o'clock.

The address to the graduates was delivered by Lewis Buffet, D.D.S., and the class oration by Jas. H. Letcher, Jr., D.D.S.

The number of matriculates for the session was fifty-three.

The degree of D.D.S. was conferred on the following graduates by C. R. Taft, D.D.S., vice-president of the board of trustees:

NAME.	RESIDENCE.
James B. Adams	Kentucky.
John M. Brookins	Indiana.
Horatio A. Black	Ohio.
W. H. Craft	Pennsylvania.
Wm. H. Collins	Ohio.
Geo. S. Crider	Ohio.
W. H. Clark	Illinois.
W. C. Duckwall	Ohio.
Edw. P. Green	Ohio.
C. W. Grambrill	Illinois.
Wm. L. Jerman	Ohio.
Jas. H. Letcher, Jr.	Kentucky.
Augustus E. McConkey	Ohio.
Francis W. Meinhardt	Wisconsin.
Arthur W. Meyer	Wisconsin.
Grant Mollyneaux	Ohio.
Walter D. M. Mason	Georgia.
Geo. W. Ostrander	Illinois.
Chas. F. Oglesbee	Ohio.
Theodore J. Phillips	Ohio.
Jas. J. Rapp	Ohio.
Albert B. Stephens	Illinois.
Sallie Strasburg	Ohio.
Beecher B. Tatman	Indiana.
S. E. Wilhelm	Iowa.
Chas. Whaley	Ohio.
B. Frank Ward	Ohio.
Chas. M. Watson	Ohio.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The twenty-seventh annual commencement of the Pennsylvania College of Dental Surgery was held at the American Academy of Music, Philadelphia, on Friday, March 2, 1883, at 12 o'clock M.

The address to the graduates was delivered by Prof. T. L. Buckingham, D.D.S.

The number of matriculates for the session was one hundred and twelve.

The degree of D.D.S. was conferred on the following graduates by Professor S. D. Gross, president of the board of trustees:

NAME.	RESIDENCE.
Franz Bauman	Germany.
J. O. Bechtel	Pennsylvania.
A. G. Bennett	Pennsylvania.
Thomas S. Boon	Pennsylvania.
Chas. L. Cadwallader	Pennsylvania.
W. Campuzano	South America.
William Chambers	Pennsylvania.
O. A. Chappell	Wisconsin.
J. Sugden Crapper	England.
L. A. Cuinet	New York.
William F. Endlich	Pennsylvania.
Elmer E. Essig	Pennsylvania.
Edwin Fischer	Germany.
Anna Flach	Germany.
Julius Freund	Germany.
E. E. Gernerd	Pennsylvania.
J. A. Giddens	Georgia.
Otto Grunert	Germany.
H. E. Hawksworth	Pennsylvania.
F. C. Higgins	Ohio.
James M. Hill	Pennsylvania.
Walter C. Hogan	California.
Max Humm	Germany.
Cynthia Kasson	New York.
C. F. Kemp	Florida.
Frank J. Kingsley	Pennsylvania.
Bertha Knopp	Germany.
Benno Krauser	Germany.
G. W. Lauffer	Pennsylvania.
A. H. Lee	Massachusetts.
August Lenz	Germany.
J. Thomas Lippincott	Pennsylvania.
J. Longton, Jr.	South America.
Horace A. Loomis	Missouri.
Hugh M. Lynch	Pennsylvania.
James M. Magee	Canada.
Louis E. Martin	Pennsylvania.
J. M. McClaren	Pennsylvania.
Charles W. Merry	Minnesota.
J. H. Meyer	New York.
Siegmund Michel	Germany.
Clodulfo Pedroso	Cuba.
H. J. Ramsey	Pennsylvania.
T. Mason Richards	Ohio.

NAME.	RESIDENCE.	NAME.	RESIDENCE.
George F. Root	Pennsylvania.	George Stuckert	Germany.
Quinn L. Ruth	Pennsylvania.	C. S. Van Orden	New York.
Hugo Rüthling	Germany.	C. H. Verbeck	New York.
Emil Schlesinger	Germany.	Jacob A. Waas	Pennsylvania.
Franziska Schmeling	Germany.	Richard Watson	Pennsylvania.
A. C. Searl	Minnesota.	William H. West	Pennsylvania.
J. M. Stickney	New York.	David L. Whitmarsh	Pennsylvania.
Wm. C. Wright	New York.		

PHILADELPHIA DENTAL COLLEGE.

The twentieth annual commencement of the Philadelphia Dental College was held at the American Academy of Music, Philadelphia, Wednesday, February 28, 1883, at 8 P.M.

The valedictory address was delivered by Stephen S. Willard, D.D.S.; the address to the graduates by Prof. Thomas C. Stellwagen, M.D., D.D.S.

The number of matriculates for the session was one hundred and seventy-nine.

The degree of D.D.S. was conferred on the following graduates by the president of the board of trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Robert W. Anderson	New Jersey.	R. Savin Hopkins	Pennsylvania.
James P. Balmer	Canada.	Charles Eugene Horn	Switzerland.
J. Mason Barcus	New Jersey.	Fred. G. Kelley	Ohio.
Charles A. Billings	Iowa.	Theodore Lachaume	Australia.
Walter F. Bisbee	Maine.	Peter McCormack	New York.
John W. Blake	England.	Robert S. Meixel	Virginia.
George W. Bragdon	Maine.	W. Ellis Michael	Pennsylvania.
George F. Cheney	Vermont.	Hermann Mosebach	Germany.
A. Nelson Coates	Pennsylvania.	Fred. S. Nickels	Maine.
Byron C. Cornwell	New York.	James North, M.D	New Jersey.
Sixto C. de Castro	Cuba.	Frank W. Osgood	Maine.
Edwin Day Downs	New York.	Royal B. Record	Maine.
Alvah W. Edsall	New York.	John Robertson, L.D.S.	Ottawa.
Henry H. Edwards	France.	Lora W. Robinson	Connecticut.
James J. H. Empson	Germany.	Daniel S. Rogers	Connecticut.
Charles F. Faber	Pennsylvania.	Eugene A. Rowe	New Hampshire.
Gustav Flörke	Germany.	Nathan J. Sanson	Pennsylvania.
E. Georg Forssman	Sweden.	C. J. M. Schücker	Sweden.
Frederick T. Gabeka	New Jersey.	Charles F. Schuler	Germany.
L. Alex. Gibson	Pennsylvania.	J. R. Solomons, Jr	South Carolina.
Lloyd S. Gilbert	Pennsylvania.	Henry W. Spratley	Virginia.
William S. Green	Rhode Island.	Andrew S. Steigerwald	Pennsylvania.
George C. Gulick	New York.	William W. Terry	New York.
Edwin W. Harwood	France.	P. R. Tunstall	Alabama.
Edwin P. Hazen	Pennsylvania.	Harrison L. Wilkins	Pennsylvania.
Joseph Head	Pennsylvania.	Stephen S. Willard	New York.
F. Anton Henrich	Germany.	Charles R. Wolf	Pennsylvania.
T. Howard Woodside	Illinois.		

NEW YORK COLLEGE OF DENTISTRY.

The seventeenth annual commencement of the New York College of Dentistry was held in Chickering Hall, New York, on Tuesday evening, March 6, 1883, at 7.45 o'clock.

The valedictory address was delivered by Henry V. Wolliston, D.D.S., of the graduating class, and the address to the graduates by Rev. William M. Taylor, D.D.

The number of matriculates for the session was one hundred and thirty-eight.

The degree of D.D.S. was conferred on the following graduates by Wm. T. LaRoche, D.D.S., vice-president of the board of trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Squire W. Allen, Jr.	New York.	Sam'l A. Hopkins, M.D.	New York.
Arthur Averhoff	Cuba.	Fred'k O. Kraemer, Jr.	New York.
Manuel A. Ballestas	U. S. Columbia.	William J. Leeds	New York.
Ferd'd H. Batterman	New York.	Horace J. Parker	Vermont.
Edward B. Coombs	New York.	John E. Pendleton	Rhode Island.
Henry F. Deane	New York.	Julius Peters	Illinois.
Charles H. Dressel	New York.	William B. Pollard	Alabama.
Juan J. Fernandez	Central America.	José Schmidt	Brazil, S. A.
Lionel H. Finlay	Long Island.	August A. Schubert	Germany.
Charles H. Foster	New York.	Charles H. Smith	Long Island.
Eduardo Fuenmayor	South America.	William E. Truex	New Jersey.
Wm. A. A. Grevers	Scotland.	Theodore I. Underhill	New York.
Robert Hastings	New York.	Fredrick A. L. Wallin	New York.
Charles A. Heller	New York.	Charles C. Weyant	New York.
Samuel E. Holly	New York.	Henry V. Wollison	Massachusetts.
Clarence H. Youngs	New York.		

BOSTON DENTAL COLLEGE.

The fifteenth annual commencement of the Boston Dental College took place at Memorial Hall, Boston, Mass., on Wednesday evening, March 7, 1883, at 7.30 o'clock.

The annual address was delivered by Rev. H. Bernard Carpenter, and the valedictory by Joseph King Knight, D.D.S.

The number of matriculates for the session was sixty-one.

The degree of D.D.S. was conferred on the following graduates by Isaac J. Wetherbee, D.D.S., president of the college:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Edward W. Brannigan	Massachusetts.	Charles C. Hazen	Vermont.
Edwin Herbert Brock	New Hampshire.	Henry E. Johnson	Massachusetts.
Williard A. Currie	New Brunswick.	Joseph King Knight	Massachusetts.
Webster P. Edwards	Massachusetts.	Francis J. Macfarlane	Massachusetts.
Edwin Elwell Davis	Massachusetts.	Charles E. Ongley	Massachusetts.
Frank Amos Godsoe	New Brunswick.	Wilbur A. Reynolds	Massachusetts.
George L. Gutterson	Minnesota.	Austin W Taylor	Maine.
Fred Hooper Hayes	New Hampshire.	Horace E. Whitney	Massachusetts.
David A. Whittle	New Hampshire.		

MISSOURI DENTAL COLLEGE.

The seventeenth annual commencement exercises of the Missouri Dental College took place at the Mercantile Library Hall, St. Louis, on Wednesday, March 7, 1883.

The address to the graduates was delivered by Dr. J. S. B. Alleyne, professor of materia medica.

The number of matriculates for the session was nine.

The degree of D.D.S. was conferred on Thomas T. Maddox and Frederick G. Zenk, M.D.

DENTAL DEPARTMENT OF THE UNIVERSITY OF TENNESSEE.

The fifth annual commencement of the Dental Department of the University of Tennessee was held, in connection with that of the Medical Department, at the Masonic Theatre, Nashville, Tenn., February 27, 1883.

The salutatory address was delivered by J. R. Walton, D.D.S., of the dental class, and the address to the graduates by Professor Duncan Eve, M.D.

The number of matriculates for the session in the dental department was fifteen.

The degree of D.D.S. was conferred on the following graduates by Thomas W. Humes, S.T.D., president of the university:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
H. D. Boyd	Alabama.	R. A. B. Moyers	Tennessee.
E. G. Grant	Tennessee.	C. A. Ryder	Georgia.
W. W. Harmon	Tennessee.	W. E. Scott	Tennessee.
J. U. Lee	Tennessee.	G. B. Stewart	Alabama.
Elias H. Locke	Alabama.	W. B. Stewart	Alabama.
J. R. Walton	Tennessee.		

INDIANA DENTAL COLLEGE.

The fourth annual commencement of the Indiana Dental College was held in Pfafflin's Music Hall, Indianapolis, on Wednesday evening, March 7, 1883, at 7.30 o'clock.

The valedictory address from the board of trustees was delivered by Dr. S. T. Kirk, and the class address was read by C. B. Bratt.

The degree of D.D.S. was conferred on the following graduates, by Dr. W. L. Heiskell, president of the board of trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Charles H. Baldwin	Kentucky.	George G. Hollister	Pennsylvania.
Joseph S. Basom	Ohio.	Richard Newhouse	Indiana.
Charles B. Bratt	Pennsylvania.	J. Edward Ratts	Indiana.
Anthony E. Bucher	Indiana.	Jerome B. Ribble	Indiana.
Albert E. Buchanan	Indiana.	Isaac N. Sheppard	Illinois.
Albert E. Burress	Illinois.	George Stathers	Pennsylvania.
Frank C. Callaghan	Pennsylvania.	W. Claude Stewart	Mississippi.
Edward P. Elson	Indiana.	Andrew J. Smith	Indiana.
Cyrus H. Funk	Michigan.	Austin L. Smith	Wisconsin.
S. Clayton Goff	Wisconsin.	Charles A. Willis	Ohio.
William S. Wilson	New York.		

DENTAL DEPARTMENT OF VANDERBILT UNIVERSITY.

THE fourth annual commencement of the Dental Department of Vanderbilt University was held in the chapel of the University, Nashville, Tenn., on Wednesday, Feb. 21, 1883.

The address on the part of the class was delivered by Richard Paul Jones; the address on behalf of the faculty by Prof. J. C. Ross.

The number of matriculates for the session was twenty-seven.

The degree of D.D.S. was conferred on the following graduates by the chancellor of the university:

NAME.	RESIDENCE.
George Marion Babbitt	Alabama.
Jefferson Davis Barns	Arkansas.
Charles Haines Beach	Louisiana.
Lafayette A. Carter	Georgia.
Charles P. McCrahan	Texas.
Erastus L. P. Ector	North Carolina.
Richard Paul Jones	Tennessee.
John Tandy Lasey	Kentucky.
Jas. Walter McFarland	Louisiana.
Jno. Robinson McNair	Alabama.
T. Rutledge Mitchell	Georgia.
James Willis Nelson	Louisiana.
Frank Wilson Petrie	Kentucky.
David R. Proctor, M.D.	Kentucky.
Cornelius A. Roninger	North Carolina.
Jas. Lee Sutphin	Kentucky.
Samuel Williamson Tully	Alabama.

DENTAL DEPARTMENT OF THE UNIVERSITY OF MARYLAND.

THE first annual commencement of the Dental Department of the University of Maryland took place at the Academy of Music, Baltimore, on Thursday, March 15, 1883.

Reading of the mandamus and announcement of graduates by the dean, Ferdinand J. S. Gorgas, M.D., D.D.S.

The address was delivered by Hon. John V. L. Findlay.

The number of matriculates for the session was sixty-six.

The degree of D.D.S. was conferred on the following graduates by Hon. S. Teackle Wallis, LL.D., provost of the university:

NAME.	RESIDENCE.
J. Hardin Baldwin	Kentucky.
F. Austin Banks	Michigan.
Bartow B. Breeden	South Carolina.
Paul Campbell	New York.
Frank G. Conklin	New York.
Joseph W. Curtis	New Jersey.
Erastus S. Dashiell	Maryland.
Newton W. Denton	Virginia.
R. Delamer Dodson	Pennsylvania.
John F. Garrett	North Carolina.
Godfrey J. Grempler	Maryland.
George W. Hotaling	New York.
R. Arthur Hungerford	Maryland.
Atwell T. Jarrett	Virginia.
Geo. Wilfred LeDuke	Massachusetts.
Charles T. Lindsey	Virginia.
B. Frank Maphis	Virginia.
Wattie B. McGirt	South Carolina.
J. Edwin Miller	Minnesota.
Eli H. Neiman	Pennsylvania.
A. Lee Penuel	Maryland.
Walter W. Rowe	Pennsylvania.
Hippolyte C. Salles	Louisiana.
Carlos N. Sanchez	Cuba.
C. Julian Smith	South Carolina.
Walter O. Smith	Virginia.
Myron W. Snyder	New York.
Walter Stuart	Kentucky.
Newton Addison Teague	South Carolina.
Norman B. Tipton	Louisiana.
J. Everett Toombs	Massachusetts.
George Andreas Volck	Maryland.
Fred. Allen Weaver	Massachusetts.
Aug. F. L. Wietfeldt	Germany.

DENTAL DEPARTMENT OF THE STATE UNIVERSITY OF IOWA.

The first annual commencement of the Dental Department of the State University of Iowa, was held in the Opera House, Iowa City, on Wednesday, March 7, 1883.

The valedictory was delivered by Perry A. Gibson of the graduating class, and the annual address by J. C. W. Coxe, Ph. D., D.D.

The number of matriculates for the session was fourteen.

The degree of D.D.S. was conferred on the following graduates by Hon. Buren R. Sherman, Governor of the State:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
William H. Baird	Iowa.	Alfred O. Hunt	Iowa.
George W. Fuller	Iowa.	Joseph B. Monfort	Iowa.
Perry A. Gibson	Pennsylvania.	Albert Morsman	Iowa.
Ernest E. Hughes	Iowa.	Benjamin Price	Iowa.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

The fifteenth annual examination of the Royal College of Dental Surgeons of Ontario was held in Toronto, March 6 to 9, 1883.

No formal commencement is held. The examination being entirely written, no thesis is required. Students in attendance on lectures, eighteen; candidates for examination, fifteen.

The following gentlemen passed the examination and will receive license to practice dentistry and the title L.D.S. (Licentiate of Dental Surgery), viz.:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
R. Bruce Burt	Hamilton.	A. A. Smith	Cornwall.
George Gibb	Wardsville.	H. H. Way, D.D.S.	Pennsylvania, U.S.
Thomas Henderson	Toronto.	C. W. Wells	Waterloo.
Jos. E. Overholt	St. Catharines.		

EDITORIAL.

DENTAL EXAMINING BOARD DEGREES.

A bill has been introduced into the Legislature of New Jersey giving authority to the State Board of Dental Examiners to confer the degree of M.D.S. *sine curriculo*.

We seriously doubt the wisdom of this project. We cannot believe that such a measure is desired or would be acceptable to any considerable number of the profession in New Jersey or elsewhere. Nor can we imagine that a degree thus conferred would be very highly esteemed either by the recipient or his associates. The community might, indeed, attach a value to it beyond its merit, but that

is precisely the feature to be deprecated. Although there may be exceptional cases worthy of such recognition, and though such power might be safely intrusted to a State board as sometimes constituted, the tendency would be to a decline of the standard of qualifications. Dislike of seeming to stand in the way of another; fear of the imputation of unworthy motives; desire to help along a clever fellow, and various other influences, would operate as reasons for concessions, and soon the standard, now none too high, would be lowered.

Dentistry as an art or science cannot advance without the exaction of study from and the possession of knowledge and skill by those who practice it. The degrees of the dental colleges mean something —are gradually, we hope and believe, meaning more and better than heretofore. They imply a compliance with a prescribed course of study, whereby graduates have at least acquired the foundation for intelligent practice and manipulative ability. The cheapening of degrees can result only in retrogression instead of advancement.

Boards of examiners can certify to fitness to practice, but their privilege should not extend beyond that, and experience has shown that even such power is liable to abuse. Once give to dental examining boards throughout the States the right to confer degrees, and the colleges might as well consider their vocation gone.

Surely legislation which proposes to belittle the honors won by years of study and effort, by obliterating the distinctive titles which have been conferred in recognition, is as unwise as it is unnecessary.

BIBLIOGRAPHICAL.

THE SYSTEMATIC TREATMENT OF NERVE PROSTRATION AND HYSTERIA. By W. S. PLAYFAIR, M.D., etc. Philadelphia: H. C. Lea's Son & Co., 1883. Price, $1.00.

This little volume of one hundred and eleven pages is a reprint of various papers of the author on the subjects indicated by the title. The treatment described and recommended is by electricity, massage, isolation, systematic feeding, etc., on the plan first introduced by Dr. S. Weir Mitchell. The experience of the author is illustrated by cases, and the details of the treatment are set forth.

SCROFULA AND ITS GLAND DISEASES. By FREDERICK TREVES, F.R.C.S., Eng. Philadelphia: Henry C. Lea's Son & Co., 1883. Price, 10 cents.

This pamphlet of seventy-eight pages is an introduction to the general pathology of scrofula, with an account of the histology, diagnosis, and treatment of its glandular affections.

OBITUARY.

DR. WILLIAM H. GODDARD.

DIED, at Louisville, Ky., Sunday, March 4, 1883, of bronchial consumption, Dr. W. H. Goddard, in the seventy-fifth year of his age.

Dr. Goddard was born in Roxbury, Mass., in 1808. He commenced the practice of dentistry at twenty-one years of age in the city of New York. After a few years he removed to Ottawa, Ill., and for several years devoted his attention to agriculture. In 1840 he removed to Louisville, Ky., and again commenced the practice of dentistry in partnership with Dr. Surgissen, this relation existing until the death of the latter; Dr. Goddard continued in practice until the year 1856, when he entered into the manufacture of agricultural implements. At the commencement of the war he found the profits of his labors in this interest swept away, and the business suspended; he then accepted a position in the custom-house. Shortly after the close of the war he again commenced the practice of dentistry, and in 1867 formed a partnership with his nephew, Dr. F. Peabody, which continued until 1870, when Dr. Peabody removed to South America, after which Dr. Goddard continued in practice until compelled by weight of years and physical infirmities to retire.

Dr. Goddard possessed an active, inquiring mind, and was ever eager for information which promised to be of value in the practice of his profession. He was connected with the Kentucky State Dental Association from its first formation, being one of the charter members. In 1866 he became a member of the American Dental Association; the following year was elected its treasurer, and was re-elected to this office for fourteen consecutive years. At the last meeting held in Cincinnati, he was elected president of the association.

For many years Dr. Goddard had suffered from asthma, being at times much enfeebled thereby. A severe attack of this disease in December last confined him to his bed, and terminated his life after an illness of twelve weeks.

Dr. Goddard was a warm-hearted, generous man, ever ready and willing to aid, according to his ability, in any effort for the advancement of his profession or the good of mankind. Hearty and faithful in his friendships; blunt and honest in the expression of his opinions, he had the respect and confidence most of those who knew him best.

At a meeting of the dentists of the city of Louisville, held on the day following his death, resolutions expressive of the love and respect of his associates were adopted, and it was voted that they would attend his funeral in a body.

PERISCOPE.

Spasm of the Facial Nerve.—Trousseau, in his "Clinical Medicine," while speaking of the various forms of chorea, draws attention to a condition of matters in which the facial muscles are the seat of rapid involuntary contractions. Beyond a short notice of the various muscles the subjects of twitching, and which he likens to chorea, there is little mention made of the causation or course of the disease. For more extended details we are indebted to Niemeyer, who, under the title of spasm of the facial nerve, or *tic convulsif*, gives a very accurate description of the spasmodic affection about to be related. According to both of these authors, *tic convulsif* appears to be a not uncommon ailment on the Continent. Of obscure causation, it has generally been considered, like its *confrère*, paralysis, to be the result of cold, the impression acting immediately on the fibers of the facial nerve itself, or producing spasmodic contraction of the facial muscles reflexly by acting on the filaments of the trigeminus. From the fact of its being regarded as a reflex condition, the result of irritation, many have sought to extend the area of irritation, and claim for its cause diseased conditions of uterus and rectum, while by not a few it has been considered the result of mental emotion. Met with more frequently among men than women, and owning for its duration a period long and uncertain, its treatment has on the whole been unsatisfactory. The use of diaphoretics and derivatives in the early stage is advised by Niemeyer, but in old standing cases, remedies, he says, are ineffectual. The application of electricity has failed to bring relief, while the suffering in some of the cases has been such that neurotomy has been resorted to.

Having met with a patient who exhibited this morbid irritability of the facial nerve, I venture to relate the particulars, fully aware that no positive conclusion as to the line of treatment can be drawn from results obtained in a single case.

G. A., aged forty-nine years, a blacksmith, placed himself under the care of Dr. Smith, of Ryton-on-Tyne, in the month of June last. In the first week of July I saw him in consultation, when we were both very much impressed by the peculiar epileptiform seizures on the left side of patient's face. Dr. Smith very kindly allowed me to have the subsequent care of the case; and thus, through his courtesy, I have the opportunity of placing a few interesting details on record.

Ten years ago patient, who is a spare man, temperate, and who has never had syphilis, suffered from similar attacks of twitching on the left side of face. This passed away, and, beyond leaving a little weakness in the tongue, patient was in every respect well until three weeks before Dr. Smith saw him. There has been no injury to the head and no exposure to cold other than that associated with his employment. The convulsive seizures are intermittent—they come on about every five minutes, and last from one to two minutes. The twitchings affect the muscles of the left angle of the mouth, left half of brow, left ear, and left sterno-cleido-mastoid muscle. When they recur his face wears a peculiar aspect: it is that of a grin, only the muscles of the left side are so tightly drawn as to give to the face

the expression of pain; the right side remains perfectly flaccid. When the spasms are severe he has difficulty of breathing; he feels too as if he were choking, owing to the extremely painful contraction of the left sterno-mastoid; and as the breathing is interfered with, the lips become cyanosed. During the period of the fit, saliva keeps flowing from the left angle of the mouth, and patient keeps rubbing his neck to relieve the painful cramp which is there. Before the twitchings commence he feels as if the floor of his mouth were too tightly drawn. Immediately after this the facial muscles become convulsed. The attacks are not, as a rule, associated with unconsciousness, but on a few occasions he has lost consciousness. After these attacks of spasm, patient's speech is extremely indistinct. The tongue on protrusion deviates to the left; but this, he says, has always been the case since his first attack. When there is no spasm his face as a whole is rather flaccid; he has complete power to move the right angle of the mouth and to contract the muscles of the right side of his face, but he cannot move those on the left side. There is, therefore, paralysis of the muscles that are the seat of recurring spasm. When at meals, the food sometimes gets in between the left cheek and the gum, and has to be removed by the finger. As the fits pass off, the twitchings become larger and slower. Pain with stiffness is felt also over the back of the neck. The fits entirely cease when he is asleep, and never wake him. There is a slight degree of paresis of the muscles of the left arm. At no part is there hyperesthesia or anesthesia. Eyesight is good, and pupils are equal. Patient had been taking small doses of bromide of potassium; these were increased to one drachm thrice daily along with ten grains of iodide of potassium.

On July 15, patient said he felt much better, and that the spasms had not been so numerous. On August 19, he was following his employment,—he had not had any twitchings for more than a week; and on October 9, he reported himself as quite recovered. The muscles on both sides of the face were normal and under control.

This record differs somewhat from that of Niemeyer, for in G. A. the left digastric muscle and sterno-mastoid were involved in the spasm. The patient's chin was drawn to the left, the lower jaw was depressed, and the head was bent towards the left. The convulsive seizure was not, therefore, confined to muscles supplied by the facial nerve, nor did anesthesia remain after the fit had passed away. There was, however, paralysis—but paralysis, I think, of the type mentioned by Hughlings-Jackson as the sequel of epilepsy. Some time ago this writer drew attention to the fact that after epilepsy the muscles are found in a paralytic condition, in which they remain until the nerve-centers recover from the exhaustion consequent upon over-discharge of nerve-force. Such occurred, I think, in this case, for, owing to the rapidity of the seizures, time was not given for the nerve-centers to be re-endowed with energy. Electrical tests were not applied, but cessation of the spasms for a few days was followed by complete return of power to the muscles of the face. Trousseau considered the twitchings I have mentioned choreic, and, as they were involuntary and ceased when patient fell asleep, the similarity is maintained. On the other hand, there is the possibility that they were epileptoid, for on a few occasions they were accompanied by

unconsciousness—unconsciousness which might be explained by a degree of stasis in the cerebral vessels from pressure on the veins of the neck—but of this we have no positive evidence as to its having been met with only in the severest paroxysms.—*Thomas Oliver, M.D., in Medical Times and Gazette.*

Enormous Enlargement of the Lower Lip.—Richard B. D., a clerk, æt. thirty-six, was admitted into Guy's hospital in 1881 with a remarkable swelling of the lower lip. Fourteen years before he had a chancre on the penis, followed by soreness of the tongue and swelling of both lips, especially the lower. There was never any rash on the skin. He was a very great smoker. The lower lip was of enormous size, everted, and pendent, so that its border was on a level with the tip of the chin, while the lower teeth were in front completely exposed to view. The mucous membrane was fissured in parts, but otherwise natural. The tissues were a little firmer than usual, but not at all indurated. There was a little tenderness on pressure. From side to side it measured three inches, from above downwards one inch and a quarter, and in thickness seven-eighths of an inch. The upper lip and tongue showed signs of chronic inflammation. There was no enlargement of the adjacent glands. He left off smoking, and was at first treated with anti-syphilitic remedies. The mucous membrane became more healthy, but the lip remained the same size. Some reduction was then effected by pressure between thin slips of wood. The lip became smaller and flaccid, but was still coated and pendent. On November 8, a V-shaped piece was removed from the center of the swollen lip, and a rapid recovery ensued. When last seen, he had no longer any eversion of the lip, which had assumed a perfectly healthy and normal aspect. Mr. Davis-Colley brought the case forward as a striking example of the enlargement of the lip which occasionally results from chronic inflammation. There was nothing in the patient's family history to indicate a scrofulous tendency. The evidence of secondary syphilis was doubtful, and there was no record of mercurial salivation. On the whole, Mr. Davis-Colley was disposed to attribute the disease primarily to syphilis, and secondarily, to the constant irritation of the inflamed surface by excessive smoking. The case was also interesting on account of the success which followed excision of part of the lip after the more or less complete failure of other remedial measures.

Mr. C. Lucas, who had seen the case in question, testified to the admirable result of the operation. He did not feel disposed to attribute such cases to struma so much as to inherited or acquired syphilis, which cause might, and probably most usually did, receive help from the influence of mercury administered to antagonize it. In Mr. Colley's patient, irritation produced by smoking was also an important factor in producing the enlargement, and carious teeth might not improbably have tended in the same direction. Mr. Lucas related the history of a young lady who consulted the most eminent authorities on account of extensive thickening of her lip, lasting over twelve months. The condition was attributed variously to herpes, lupus, etc., but it was entirely remedied by the extraction of the two lateral incisors, which were decayed and filled with stopping,

while from one a permanent sinus extended, to which the irritation causing the enlarged lip was due.

Dr. W. B. Hadden suggested that the thickening might be consequent on lymphatic obstruction.

Prof. Lister commented on the interesting nature of the case, shown in the readiness with which the portion of lip remaining, after ablation of a V-shaped piece, returned to the normal. This presented analogy to the restoration of enlarged tonsils following excision of portions only of their substance, and to those cases in which similar restoration of neighboring structures sympathetically affected took place—*e. g.*, recovery of hearing after excision of part of enlarged tonsils, consequent on a return to the usual conditions of the Eustachian tube, which not rarely shares in the changes undergone by the tonsil. An instance of the kind had recently occurred in his own practice, the patient, a youth of fifteen, and completely deaf, being able to hear well as a result of partial removal of his enlarged tonsil. In another case of lipoma of the nose—grog blossom—recently operated on, he had pared down the chronically-inflamed and hypertrophied dermis of the organ, but he did not interfere with the adjacent structures, though they were involved in the changes produced by overgrowth. These, as well as the nose itself, were completely restored to a normal state.

Dr. Meadows instanced a case occurring in his own practice in which part of the hypertrophied mons veneris was removed by means of the écraseur from a lady thirty-two years of age, with the result that menstruation soon after ceased, through reflex atrophy of the ovaries.

Mr. Davis-Colley considered that the result in his own case was influenced by diminution of thickening in the lip by tension of the part after operation, and also by reduction of the pendulous condition previously existing. He had observed nothing to indicate a lymphatic origin of the abnormality, and, respecting the teeth, could only say that those which were exposed were not carious. On the whole, he attributed the affection of the lip to the action of secondary syphilitic taint, combined with irritation from tobacco-smoking. —*Transactions Clinical Society of London*, *Med. Press.*

Damage to the Heart from the Inhalation of Nitrous Oxide. —In *The Lancet*, vol. i., 1876, p. 689, Mr. Cartwright makes some important observations on some of the serious consequences which may follow the inhalation of nitrous oxide, particularly with reference to the effect of repeated inhalations on a heart whose walls are already weak, though its valves may be competent. I have lately met with a case which appears of considerable importance, as showing the effect that several inhalations of gas may have on a heart whose valves have been affected without there being much consequent affection of the walls.

Miss F. O.——, aged twenty, had her first well-marked attack of rheumatic fever in July, 1876. After it had lasted more than three weeks, the fever recurred, and it was during this attack that endocarditis was first set up; a mitral murmur of considerable intensity remained after her recovery. In January of the following year she had a second attack of acute rheumatism, which passed off, leaving

the murmur in much the same condition; but, as she continued to have rheumatic pains and a good deal of palpitation and dyspnœa, she was sent to Bath, where, under Dr. Spender's advice, she derived much benefit from the baths and other treatment, "the heart became stronger and the murmur less intense," as he has been kind enough to inform me. A second visit in the following year was also attended with benefit, and my partner, Mr. Bartlett, under whose care she had been all this time, found that on her return the mitral murmur was no longer audible. On Oct. 7, 1882, I was asked to examine her heart in order to decide whether she might safely inhale nitrous oxide preparatory to having some teeth drawn; and as at this time no murmur was audible, and her heart, though somewhat enlarged, appeared in good condition, I had no hesitation in advising her to have the operation performed under nitrous oxide. Accordingly, on October 17, she had two teeth extracted while under the influence of the gas, and again two on the 21st, when evidently something did not go quite right. The administration had to be interrupted. The patient felt some pain at the time, and complained afterwards of violent headache and a feeling of confusion, though after the first administration she had recovered quickly. She experienced palpitation in bed two nights after this. A few days later she returned home from the town where the teeth had been extracted, and, on October 28, I was asked to examine her chest, as she had been coughing a great deal and had further attacks of palpitation, and to my surprise found that a loud mitral murmur was again present, conducted towards the left, though not audible at the angle of the scapula; the apex beat was in the nipple line, where it had been before.

I should add that in this patient the murmur has the peculiarity of being very much louder in the recumbent than in the erect position. This to some extent may explain the apparent disappearance of the murmur previously to the administration of the nitrous oxide, as she was only examined by me while sitting up; but I have no doubt that this does not account for all the difference that is now perceptible, for at present not only is a distinct systolic apex murmur audible while she is standing, but also she complains that her palpitations and shortness of breath have returned much as before. It appears to me therefore quite clear that the nitrous oxide must be held to be responsible for her present condition; and I have advised her for the future to submit to the pain of extraction rather than to run the risk of further damage by inhaling any anesthetic.—*Walter Ottley, F. R. C. S., in The Lancet.*

Syphilitic Inflammation of Gums resembling Scurvy.—The next man is Isaac E., forty-eight years of age, a policeman. Last July, after an attack of tonsilitis, he was much reduced in general health, and complained of debility, poor appetite, inability to work. Three weeks ago he observed soreness of the gums of the lower incisors; they subsequently became swollen, spongy, and ulcerated, the teeth becoming loose. The gum of the upper jaw was somewhat red and swollen, but to a much less degree than that of the lower jaw. There had been no hemorrhages, and no other scorbutic symptoms. It should be stated that he also had a chancre six years ago.

Iodoform has been applied to this ulcerated and spongy gum for a few days, and it has already begun to improve. In cases in which we cannot apply the powder in bulk or with the insufflator, the iodoform can be used in solution in chloroform (1 to 10 or 20), collodion, or ether; the menstruum evaporates and leaves the iodoform, a nice way of making the application.—*Clinical Lecture, J. Solis Cohen, Jefferson Medical College, College and Clinical Record.*

Necrosis of Jaw due to a Fragment of Tooth.—Dr. Post narrated the following case: A sequestrum of the lower jaw, which he presented, was removed six or eight weeks ago from a young man who, about two years before, applied to a dentist to have a bicuspid extracted. The tooth was broken, and the principal part of it was left behind; no immediate irritation followed, but, after the lapse of a year and a half, inflammatory swelling occurred over the bone, and portions of dead bone were discharged, together with the remnant of the tooth. For a long interval thereafter no fragments of bone were discharged. When the patient applied to Dr. Post there was a sinus leading to roughened bone. He cut down and removed the sequestrum shown. The special interest of the case was with reference to etiology. The necrosis came on at a somewhat remote period after the breaking of the tooth a part of which was left behind; then irritation increased until a considerable portion of the jaw had to be removed.—*Proceedings N. Y. Med. and Surg. Society, in N. Y. Med. Journal.*

Naphthalin as an Antiseptic.—Owing to the occasional startling constitutional effects produced by the topical application of iodoform, attempts have been made in various directions to discover some antiseptic which would be as useful as that drug, but free from its disadvantages. Fischer (Strasburg) claims that he has found such an antiseptic in naphthalin.

Naphthalin is available for all the purposes to which iodoform has been applied, and as yet no constitutional effects have been observed to follow its use locally.

It is as powerful an antiseptic and "antibacteric" as iodoform, and has a less disagreeable smell. Its application causes a slight transitory sensation of heat, but no pain. Anschütz states that very sensitive granulations sometimes bleed rather freely after it has been applied, owing to the sharp angles of the hard crystal. This can be obviated by using it in fine powder, though if there is much discharge it is then apt to form a crust on the surface of the granulations. When the crystalline form is used the discharges escape freely.—*Centralbl. f. Chir.—Glasgow Med. Journal.*

Superficial Excoriations of the Tongue.—In two cases (females) occurring in the private practice of Dr. W. W. Hack, he noticed besides red, also yellow marginal excoriations. The latter changed location gradually, and were painful even when unirritating food was taken into the mouth. Hereditary syphilis as the cause of these desquamations could be excluded with certainty. Both women had suffered from the affection since childhood, and the tendency to these excoriations was traced back three generations. Dr. Hack

closes by saying that he has observed these yellow-margined excoriations only in females, while in 600 soldiers he has found twelve times red excoriations, but not once yellow-margined ones.—*Detroit Clinic.*

ANOTHER DEATH FROM CHLOROFORM.—The death of Mrs. Laura B. Watts, wife of Dr. E. M. Watts, Portsmouth, Va., occurred from the administration of chloroform for the extraction of teeth, on the 9th of March. Dr. Watts himself gave the anesthetic, and the teeth were extracted by Dr. John Linn. An ounce and a half of chloroform was administered, and fourteen teeth removed, but the patient did not regain consciousness. Mrs. Watts was about thirty-six years of age, and appeared to be in excellent health before the unfortunate occurrence.—*Local Paper.*

HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

TIC DOULOUREUX.—A lady who has lost all the teeth in the upper jaw is suffering from severe pain in the left side of the face—tic douloureux. The last root extracted was that of the left canine, which had a fistula. About a month after this extraction the tic was felt for the first time, and is since increasing in always shorter intervals. All I know has been tried and several physicians consulted, but nothing gives relief. In touching with the finger on the palate a spot, just opposite to the place where the apex of the cuspid root was, a severe pain is felt. One cannot see anything abnormal in the mouth. Tho lady is sixty years of age, but of good health; she is my mother, and one may suppose how thankfully I shall receive an answer.—D. D. S., *in France.*

PULP-NODULES.—Dr. John B. Rich described a case before the New York Odontological Society (DENTAL COSMOS for November, 1882, page 581), of the death of the pulps of teeth without apparent cause, which is identical with one which has recently occurred in my practice, except that my patient is about twenty-two years of age, has strong, hard teeth, and had only one tooth affected. Although in many cases I find pulp-nodules, in this case there were none. The tooth became quiet after treatment. Dr. Rich's description of the first tooth affected in his patient's case corresponds with the condition of the tooth of my patient exactly. I would like to ask the doctor if he has yet discovered the cause of the trouble, as it would probably help me to a solution of my case.

As I have stated, I find pulp-nodules very common, as in the following case: The patient was a gentleman about forty-eight years of age, of a sanguo-bilious temperament, who suffered severe pains in the temple. On consulting a dentist, he was told that his teeth had nothing to do with his trouble, and he was sent to a physician for treatment for neuralgia. Finding no relief, he came to me. After a careful diagnosis, I decided to extract the upper right wisdom-tooth, expecting to find pulp-nodules. There were three small grains in the pulp, and I supposed that the cause of the trouble had been found. The patient continued to suffer, however, and returned, when I extracted the adjoining molar, and found the canal

tightly sealed at the end from calcification. A glue-like substance of about the consistence of paste, found in the pulp-chamber, contained a number of small nodules. The condition may be seen from the half of the split tooth which I send. Calcification has caused a division of the pulp-chamber into two apartments. The odor from the split tooth was exceedingly offensive. The patient experienced immediate relief, and his trouble has ceased.—GRANITE HILLS.

AIR-CHAMBERS.—Do air-chambers as plate-retainers possess any real advantage over the old method of "adhesion by contact?" If so, are they of general utility, or simply so in special cases depending on mouths of peculiar conformation and pathological condition; and why? If the plate depends for its retention in the mouth on the principle that "nature abhors a vacuum," by its perfect surface adaptation, duplicated from an accurate impression, how is it possible for an air-chamber, as ordinarily constructed, to improve its power of adhesion, inasmuch as this surface of the plate is not increased? Experience with diversified mouths has inclined me, however, to the opinion that in some special cases of irregularity in oral and tissual structure and non-uniformity in gum and palate density, the air-chamber is an improvement over the old suction method; its utility depending to quite an extent on the size, shape, and position relative to the plate. For the edification of the writer and others, I hope this question will be discussed.—L. MANKER.

ANOTHER METHOD FOR ARTIFICIAL CROWNS, ESPECIALLY FOR THE UPPER AND LOWER BICUSPIDS.—Prepare the root by grinding and drilling just as for the old-fashioned hickory pivots. Make a gold ring nicely fitting the root, as for the Richmond crown. It may be done right at the chair without an impression or model. The ring must fit tightly, and be about the eighth of an inch wide. Fit a metal or other pivot into the root, letting it project the whole length of the intended crown. Grind a Bonwill crown to nicely fit inside the ring. Put pivot and ring in place, fastening the former preferably with gutta-percha, and letting the ring hang free of the end of the root about half its width, say the sixteenth of an inch. Then insert the crown with any cement you can handle easiest. The pivot, of course, passes the whole length of the crown and appears at its masticating surface. Cut it off and fill around it with gold or amalgam, as you prefer. The ring will show a little, but this is a small matter in a bicuspid.—T. H. C.

LATE ERUPTION OF A WISDOM-TOOTH.—In December last a gentleman about sixty years of age, a planter, living about a mile from my residence, called upon me with reference to a trouble in the lower jaw from which he was suffering, and which he supposed to be from the root of a tooth. He had no teeth remaining in the lower jaw, and the round, white spot to which he pointed as the seat of the trouble did not look like a root, but there was considerable swelling of the part and a discharge of pus from around it. Two months after a wisdom-tooth had fully erupted, explaining the cause of the disturbance.—F. GAUDIN, *Donaldsonville, Ga.*

ARTIFICIAL CROWNS.—The gold band crown, secured by amalgam, described by Dr. Churchman in March, 1883, DENTAL COSMOS Hints and Queries, has "merit," and has been used for some years. Directions for an operation, which is an improvement upon banding the root, and which consists of so arranging the band as to let it rest upon the root, thus preventing any possibility of peridental irritation from impinging of band, will be found in Flagg's "Plastics," page 124. —D.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

ARTIFICIAL CROWNS.

BY JAMES E. DEXTER, M.D.S., NEW YORK, N. Y.

(Read before the First District Dental Society, State of New York.)

(Continued from page 179.)

DR. E. W. FOSTER, of Boston, in a publication in the DENTAL COSMOS for July, 1874, shows the first improvement over the ordinary pivot-crowns since Lawrence; but the crowns, and his method of pivoting, were exhibited for him by Dr. George T. Moffatt before the New York Odontological Society in the preceding April, and the crowns had been made and the method was in use by him for some time previous to the latter date. The crown and method are shown in Figs. 11 and 12. Only an incisor is shown, but all forms are made. The crown shows a hole completely through the tooth, the palatal portion being enlarged and rounded or semi-spherical inside. The method of pivoting with these crowns is here condensed from Dr. Foster's description as follows: The pulp-canal is drilled out sufficiently to receive, in the lower portion of its length, a compressed hickory peg, the canal above the peg being filled with gold. The peg is finished off flush with the face of the root, and the crown is fitted in position and held there while a drill is passed through the hole in the crown to the distal end of the peg, the hole thus made being of a proper size to receive a steel screw made for the purpose. The wood is tapped for the screw. A few layers of soft gold foil being laid upon the root, the crown is placed thereon, and the steel screw driven to its seat, the under side of its head being rounded to fit the rounded part of the cavity in the crown. Then gold is packed in the

FIG. 11.

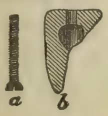
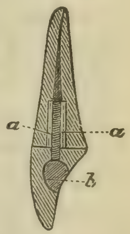


FIG. 12.



hole over the screw-head. Gutta-percha, oxychloride, or varnish, may be substituted for the foil in the joint.

Here we have almost an exact reproduction of Lawrence's old crown; so exact, indeed, that the same illustration has served me for both crowns. And as to the wood peg in the root, James described it in 1814. And as to the screw, Woofendale was using it in 1783. The only novel things in this invention appear to be the rounded head of the screw and the rounded form given its seat in the crown, and the use of steel in the screw itself.

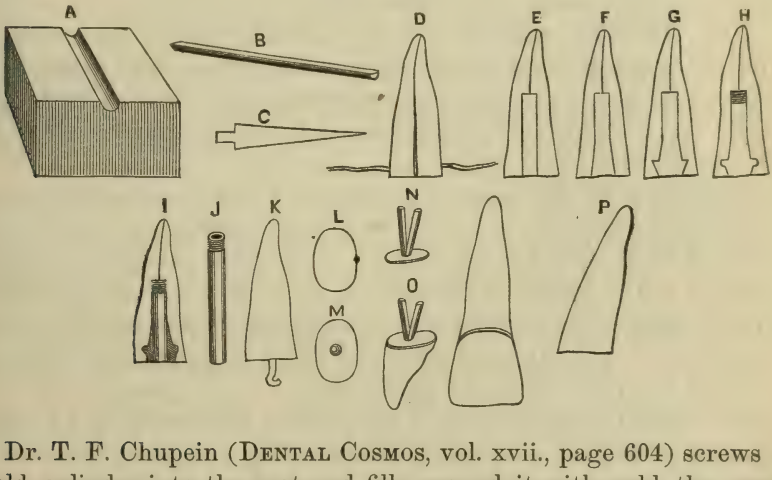
Dr. J. G. Van Marter (Dental Cosmos, vol. xvi., page 640) uses platinum wire and plate-teeth. The latter he grinds to fit, and affixes a backing of very thin (No. 36) platinum plate, leaving it long enough to bend at right angles and form a cap for the posterior half of the root-face. Another cap of the same plate is cut to the size of the root, and holes punched in both caps for the pivot. The caps and tooth are set in place on the root, the pivot inserted, the caps burnished down to place, and the whole soldered. He attaches the tooth to the root with gutta-percha or powdered shellac, the tooth being warmed to soften the attaching cement.

In the *Dental Register of the West*, vol. xvi., page 162, Dr. J. Richardson describes the first processes of applying hard rubber to pivot-work. He wrapped gold wire in vulcanite, thus making a rubber-bushed pivot in place of the old wood bushing. He also gives the following, which may be called the "vulcanite method." An ordinary pivot-crown is loosely fitted up with a wood peg, which also fits loosely the canal in the root. The crown is ground from before backward so as to leave a space between the posterior portions of root and crown. Wax applied to the root and crown at once holds the crown and pivot in proper relative position, and gives an impression of the root-end. The whole is withdrawn, and so invested in plaster that the crown, peg, and wax may be removed, and the crown be capable of accurate replacement on the model. The hole in the root and root-model are now properly drilled by the same drill to receive a gold wire pivot; the latter being long enough to project above the root into the crown, and being smaller than the holes in both root and crown, to allow of vulcanite enwrapping it within these spaces. Now the hole in the root-model is packed with vulcanite gum, the gold pivot heated and pushed through the gum to its place, the hole in the crown also packed, and the crown forced to its position on the model over the projecting end of the gold pivot. More gum is packed in the palatal groove between root and crown, the whole flasked and vulcanized, and the finished crown forced to its place on the root, a few folds of gold foil being interposed to fill the joint tightly.

Dr. Richardson also made vulcanite tubes for pivot-sockets, to replace those of gold commonly used, by vulcanizing a layer of gum around a gold wire, which should afterward form the pivot. The wire, being wrapped in a single layer of tin foil, was readily drawn from the tube after vulcanizing, the tin being removed with muriatic acid. A proper length of the vulcanite tube was inserted in the root either by force and a tight fit, or by aid of plastic cements, and the pivot, vulcanized to a porcelain crown, was made to take up the extra space in the tube caused by the removal of the tin foil, by bending, or by splitting and springing it open.

An important variation of this method, by Dr. H. C. Register (Dental Cosmos, vol. xvii., page 403), is to use an ordinary plain rubber-tooth, and form its palatal contour with vulcanite. Through this a hole is drilled, in line with that in the root, the latter being filled with hickory wood. The crown now being held in position, a drill is passed through the hole in the vulcanite into the wood in the root, and a gold screw-pivot is passed through the crown into the wood root-socket, holding the two firmly together. The details need no further description.

Fig. 13.



Dr. T. F. Chupein (Dental Cosmos, vol. xvii., page 604) screws a gold cylinder into the root and fills around it with gold, the canal having been enlarged and undercut for the purpose. A plate is accurately fitted to the root-face, and has a split pivot soldered to it. A plain plate-tooth is soldered to the plate. (Fig. 13.)

Dr. D. M. Clapp (Dental Cosmos, vol. xviii., page 53) fills his root solid with gold, extending the filling over the root-face. He then drills a hole in his filling for the reception of a wood pivot.

Dr. J. B. Wilcox (Dental Cosmos, vol. xviii., page 110) uses amalgam in the same way.

Dr. W. G. A. Bonwill has no less than three methods (or variations of methods) of pivoting before the profession under his name.

The first Bonwill method (Fig. 14) was brought out in March, 1877 (DENTAL COSMOS, vol. xix., page 481), in a paper read before the New York Odontological Society. The details, condensed, are as follows: A plate-tooth with cross-pins is taken and ground to fit the tooth at the labio-cervical edge. Its base on the palatal side is ground off from near the pins to the cervix to allow room for subsequent operations. The tooth is then backed and soldered to a gold plate roughly fitted to the root. In soldering, gold is flowed onto the backing and base to fill out the contour to natural shape. A hole is then bored through this contour backing at an angle obtuse to the direction of the pin in the root, and deeply countersunk at the palatal aspect. The root is now drilled for the pin and beveled inward at the gingival margin. The pin, of gold or platinum, flat-headed at the root-end, and screwed at the other, is now bent at the crown-end to allow it to sit centrally in the hole in the crown, and packed into the root with amalgam; which latter may fit to the base of the crown, or have a layer of gutta-percha interposed next to the base. After the amalgam has hardened, the crown is placed over the pin in position, and a nut screwed on the pin with a forked screw-driver and afterwards covered with oxychloride of zinc.

FIG. 14.

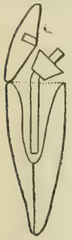


FIG. 15.

Variations of this method include an ordinary pivot-tooth with gutta-percha in both root and crown, or a plate-tooth with tube soldered to the pins for the passage of the pin. Also, the porcelain crowns of Dr. Foster, of Boston, or those of Dr. Bonwill himself, may be used, with pin and nut as described, in place of the backed plate-tooth. The method first given, however, is the one especially detailed and pictured in the publication.

The second Bonwill method (Fig. 15) was described in the DENTAL COSMOS of August, 1880. This method comprehends the modern "Bonwill crowns," which are now so well known. The method, in brief, is simply to force a triangular pointed and barbed platinum pin into a root freshly filled with amalgam, to fill the previously fitted crown with the same substance, place it over the pin and force up to its place, the pin resting in the hole in the crown. Various modifications of this method are also suggested; as, a nut on the end of the pin, like the first method; and a gas-vent, made by allowing a flattened side of the pin to rest against one wall of the canal, the amalgam not being packed in the space thus formed, and a hole

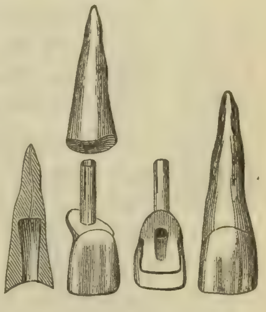
bored obliquely through the side of the root, from near the gingival margin, communicating with the space behind the pin.

The third Bonwill method (Fig. 16) differs from the second only in presenting a better formed crown, a new shape of pin,—the flat, angular-backed, saw-tooth-faced, well known to all,—and retaining-cuts in the root made with a wheel bur.

A method devised by Dr. H. K. Leech, of Philadelphia, shown in Fig. 17, and described in the DENTAL COSMOS for April, 1879, is as follows: The root is drilled out to a depth of about three-eighths of an inch to a diameter of about No. 16, standard (American) wire-gauge, the bottom of the hole being flared or enlarged, and the canal above filled with gutta-percha. A gold tube is made to fit the hole accurately and project sufficiently for convenience of handling, and is soldered through a hole in a gold base struck to the root, projecting through the plate some distance. A plate-tooth is fitted to the root and plate and soldered to the latter, gold being flowed onto the plate and backing and around the projecting tube to form the palatal contour, and the tube cut off flush with the latter. We now have a plate-tooth, gold backed, with a tube-pivot, the orifice of which opens on the palatal aspect of our tooth. The root-end of the tube is now slit perpendicularly in three or four places, for about two-thirds of its length, a thin sheet of warmed gutta-percha is placed on the base of the crown around the tube, and the whole is pushed securely to place. Now pack gold or tin into the tube, *condensing the bottom portions so that the slit end will spread and tightly fill the flared end of the hole in the root*, and the operation is complete.

FIG. 16.

FIG. 17.



This way of fastening a pivot-tooth to a root is, so far as I can learn, as novel as it is ingenious; and, if tin be used to fill the tube, so that the tooth may be easily removed in case of trouble, it seems an excellent addition to our list of pivot-teeth.

Dr. G. W. Weld (DENTAL COSMOS, vol. xxi., page 289) has a method which he terms "ingrafting." The root is *extracted* and cut off squarely at the neck. It is then cleaned out, and a porcelain crown having a tapering screw baked into it (Fig. 18) is screwed to place. The whole is then *replanted*. This may be truly called one of the "curiosities of pivoting." As a further curiosity, in connection with this case, I will mention that Pierre Fauchard used an exactly similar screwed crown; the picture of which, published in 1733, is

almost an exact counterpart of the illustration used in Dr. Weld's article.

Dr. William Jarvie, Jr., (DENTAL COSMOS, vol. xxi., page 322) drills holes in the models of bicuspid and molar roots to correspond to their canals (Fig. 19). Into these he fits wires of platinum-and-iridium alloy, and solders to these a plate or cap, on which a plate-tooth is, in turn, fixed. Gutta-percha is used in the roots, the crown warmed and pressed to place.

Dr. Henry Weston (DENTAL COSMOS, vol. xxiv., page 81) undercuts and enlarges the root to allow packing in amalgam, gold, or cement around the pin (Figs. 20, 21). The latter has a special form, being spear-shaped and notched, and is of platinum-and-iridium alloy. The crown used is also a special one, concave on its palatal aspect, the pins being within the depression. After fitting the crown and pin, the two are soldered together and attached to the root with cement, gold, or amalgam, packed around the pin and up the back of the tooth.

Dr. J. Foster Flagg's method is shown in Fig. 22, and described as follows: Select a suitable plate-tooth with straight pins, fit it into position by grinding, and bevel it by cutting away from near the cervical pin to the labio-cervical edge. For the pin he uses platinum wire of about No. 14 United States gauge, hammered flat at one end. Through this flattened portion holes are punched for the pins in the crown, and the platinum wire is then soldered fast to the tooth. Barb the pin a little, and if it fits with the crown in position it is ready for insertion. The hole in the root should, if possible, be a little enlarged just within the opening, to make a dove-tail attachment. After drying the canal, place the crown in position, and pack a quick-setting amalgam into the root, building down with the same upon the back of the crown. When it has thoroughly set, trim away any surplus amalgam, and polish.

FIG. 18.

FIG. 19.

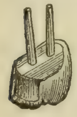
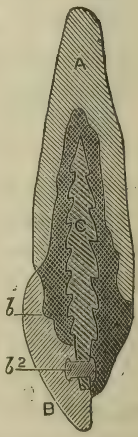


FIG. 20.

FIG. 21.



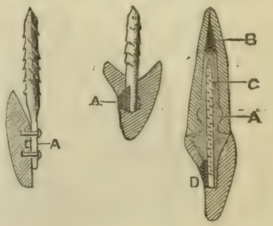
A suggestion of Dr. Boice (Philadelphia), in addition to the above, is to cut a groove across the tooth between the pins before attaching the platinum dowel; the space thus left behind the dowel being filled with the amalgam which forms the posterior contour, and serving to more fimly attach the amalgam at this point. I would myself suggest, for further security to the contour portion of the filling, that the flattened portion of the dowel itself be beveled inward

towards the tooth before soldering, the amalgam being packed in behind and over the bevel.

This seems to be a "ready method" of pivoting. Its simplicity commends it, and it has, undoubtedly, if carefully done, much strength and durability. Indeed, I am not at all sure that it may not be classed among the best methods of pivoting.

Dr. M. H. Cryer, of Philadelphia (Fig. 23), fastens Gates-Bonwill crowns to their dowels by flattening the tooth-end of the dowel, introducing it into the crown from the root-end (so that the flattened portion is opposed to the hole in the crown on the lingual surface), securing it in position on the crown after fitting with wax, investing it properly, removing the wax, and flowing gold into the hole upon the flattened part of the dowel. This is the method published thirty years ago by Dr. Frank Fuller. Another way of Dr. Cryer's is, to pack oxychloride of zinc in place of the gold, and heat it over a lamp, after which, he says, it "does not seem to be affected by the fluids of the mouth." In the case of packing with oxychloride the whole crown is filled with that cement. Dr. Cryer's way of using either of the crowns prepared as above is, to fill the upper portion of the pulp-canal with gold, and the balance of the root and the crown with gutta-percha, heating the crown and pin and forcing up to place (Fig. 24.).

Fig. 22. Fig. 23. Fig. 24.



I will not comment on the uses to which the gold is put in this method, further than to suggest that it would have been quite as well to leave it out of the *root* altogether; for, if gutta-percha will prevent entrance of moisture at the joint between root and crown, it would seem to be equally efficacious for that purpose at the apical foramen.

In Dr. Büttner's paper on his artificial crown, read before the New York Odontological Society in October last, he describes the following method of pivoting: "A square pivot of platinum-and-gold alloy is made by soldering two narrow pieces together at one end (or bending a long piece in the center). The pivot is finished smooth, and accurately square. Thin platinum is bent around it, jointed, and soldered (into a square tube). The root is prepared with undercuts, and drilled out largely in excess of the size of the pivot used. The square cylinder is fastened in the root with gold or amalgam, which, when hard, is filed smooth. A plate of soft gold is fitted to the margin" (surface?) "of the root, and the pivot after being placed in position is soldered to it. A plate-tooth is backed and fitted and soldered to the plate. The free ends of the pivot are sprung apart before inserting."

Dr. Büttner credits this method to Dr. T. J. Thomas, but gives neither reference nor date. Dr. W. A. Bronson has used the method for several years, and also Dr. C. A. Woodward. I have not discovered any printed description of this method so far back as I know it to have been in use, and, therefore, since Dr. Woodward dates his employment of it as 1862, we must give him the credit for its conception. He also used this pivot in the construction of dental plates.

Dr. W. H. Gates (DENTAL COSMOS, vol. xxiv., page 119) uses a double-pointed screw-pivot, set in amalgam, with a Gates crown, and special instruments for setting the screw and packing the amalgam.

Before the American Dental Society of Europe, at its meeting in August, 1882, Dr. Bishop presented the following method of pivoting a bicuspid. The root being a first bicuspid, both canals were opened, and a thin wire set loosely in each, the projecting ends being bent together like a staple over the root-face. Gutta-percha was then packed upon the root-face, around and under the wire staple. A plain rubber-tooth was now ground to fit, and held in place while the gutta-percha was continued over its pins and shaped to contour.

FIG. 25.

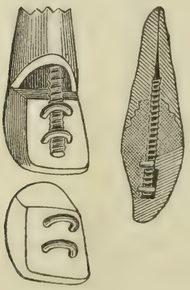


FIG. 26.

FIG. 27.

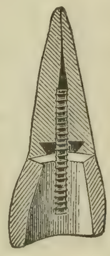


FIG 28.

The whole was now removed together, invested, vulcanite gum substituted for the gutta-percha, and vulcanized. The tooth was set in place with plastics in the canals around the pins.

This method appears to have much value for certain cases. Variations of it may be noted; for instance, using oxyphosphate, oxychloride, or fossiline in place of the gutta-percha, and leaving the tooth in place for a temporary purpose instead of removing and vulcanizing. Also, using heavier wires of platinum-and-iridium alloy for the pivots, and springing them apart, after vulcanizing, so as to obtain their spring-pressure in maintaining the tooth in place.

Through the courtesy of Dr. J. W. White and Mr. E. T. Starr, of The S. S. White Dental Manufacturing Company, I have been favored with a description and specimens of some new methods of pivoting

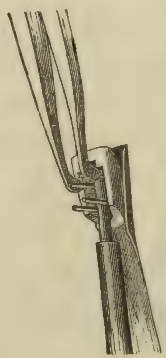
devised by Dr. W. Storer How, of Cincinnati. Dr. How has made some special crowns, which appear admirable in design and ease of adaptation. These are as follows: 1. The twin-stapled crown (Fig. 25). 2. The four-pinned crown (Fig. 26). 3. The all-porcelain hollow crown (Fig. 27, sectional view). 4. The double-faced or convertible crown (Fig. 28), which shows a cuspid face on one side and a lateral face on the other, the sides being of equal height. The methods of setting these may be briefly described as follows: Setting the posts, being the same for all the crowns, is thus performed (Fig. 29): the root is cleaned out and filled in the apical third of its length, and the root-face filed in the usual concaved form. The unfilled portion of the pulp-canal is now measured, a guide or stop set to that length upon a special drill, and the root drilled as far as the stop will allow. A special tap has its stop now set to the same length as the drill just used, and the root is tapped out. A threaded metal post or pivot, the size and threads of which correspond to the tap used, is now measured properly by aid of the guides on the drill and tap, and

FIG. 29.

FIG. 30.

FIG. 31.

FIG. 32.



screwed home in the root, a special pliers being employed to grasp it. The taps, drills, and screw-pivots are made of only one size for all operations, Dr. How claiming that the manufacturer is thus enabled to secure great exactness in making them, and the dentist is saved the disaster of using the wrong tap or post for a number of sizes, while attaining the tactile skill necessary to success with less labor and in less time. I shall not stop to raise objections to this reasoning, but will explain how the various crowns may be set on a root thus prepared. The twin-stapled crown (Fig. 25) is simply slipped over the post (the latter being bent to such inclination as is necessary), and the crown is ground to fit the root, its root-end being beveled so that only a narrow labial margin shall touch the root. The crown, being fitted, is now held firmly in place while the staples

are bent tightly to the post by the special pliers (Fig. 32). The crown is thus firmly attached to the root, entirely independent of the strength or support of any filling-material, bushing, or packing whatever. To complete the operation by forming the palatal contour, plastics (or gold, if desired) may be packed under the crown and around and over the posts and staples. A later improvement is the employment of a mandrel-pliers (Fig. 32, 33), with which to bend the pins so as to nearly fit the post before placing the tooth upon the root.

The four-pinned crown (Fig. 26) is used in the same way, except that it may be *slid horizontally against* the post instead of being slipped *over* it, the post occupying the space between the two pins on each side. This capability is of special value in cases like that shown in Fig. 34, where the adjacent teeth converge at their cutting-edges, so that a crown, to fill the space, would have too wide a neck to go vertically between its neighbors. Here the four-pinned crown may be applied *from the front*, fitted and adjusted, and fastened in place.

FIG. 33.

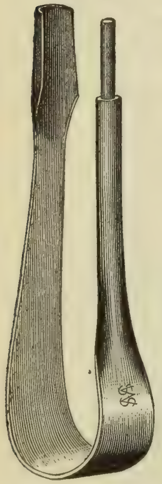


FIG. 34.

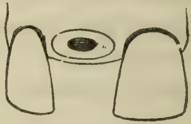
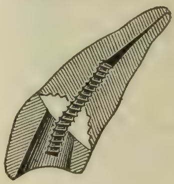


FIG. 35.



The application of the all-porcelain hollow crown (Fig. 27) needs no detailed description. Its hollow, beveled outward all the way from its neck, is simply filled up around the post with gold or plastics. It may be noticed that the opening at the neck of the crown is oblong, thus providing for horizontal adjustment; while the sides of the hole, flaring all the way outward, allow of very considerable variation from the exactly vertical position without interference with the vertically-set post, or necessity for bending the latter.

The double-faced or convertible crown (Fig. 28), besides some small facility of selection afforded by its different faces, has a much more valuable attribute. Looking at the ordinary pivot-crown, we are aware that, if much inclined from the perpendicular, its hole may be almost ground out in fitting. With the convertible crown when it is necessary to incline such a crown, as in Fig. 35, there still remains on the ground side plenty of material for attachment and strength.

The new method and crowns of Dr. How appear to possess many points of great excellence. No impressions are taken, all the work being done at the chair. The method appears exact. Each step is

under perfect and instantaneous control; nor is anything in the whole process left to conjecture, or any point of the operation performed in the dark. The root and post are accurately measured, and the latter firmly fixed in position by a short series of perfectly plain and comprehensible steps, each under full observation. The crown is ground directly to the root-face, without intervention of inaccurate impressions, or subject to defects of fit through soft or crumbling plaster models; and is fastened with great strength to the firm post, *entirely independent of aid from cements, solders, or filling operations* of any kind. Indeed, so soon as the staples or pins are bent to place around the post, the operation, so far as strength and retention are concerned, is completed. No less a recommendation for this process is the facility for *undoing* the whole work and regaining the root exactly as it was in the beginning. The plastic contour being removed, the pins or staples may be simply unbent or loosened, the crown removed, the post unscrewed, and the root, with empty canal, is as before. Thus opportunity is offered for treatment of apical lesions after the operation, as well as for changing the operation, should such a course be afterward deemed desirable. In addition, for treatment of roots crowned while unhealthy (a case sometimes necessarily occuring,) a *hollow* screwed post may be used, in place of the solid one described, and the patient may wear the crown while the root is treated through it. In short, this method appears to combine more advantages than almost any other with which I am acquainted.

(To be continued.)

CONSERVATIVE TREATMENT OF EXPOSED PULPS.

BY FREDERICK A. L. WALLIN, D.D.S., GILBERTSVILLE, N. Y.

Conservative treatment of exposed pulps was first favorably spoken of by Koecker in 1846. Since that time the profession has made great improvements over the rude treatment of that early date, and to-day it is the general rather than the exceptional practice.

Before entering upon an intelligent study of this pathological condition and its treatment, it is necessary to in some degree understand the structure and development of the tissues in their normal condition.

The dental germs, at from the seventh to the ninth week of fetal life, present themselves independent of, but directly beneath, the enamel organ, which is an elongation of the epithelial layer of the mucous membrane. The germ at this time consists of papilla (myxomatous or medullary tissue) rich in vessels and living matter. Soon the odontoblasts are formed by organization of the myxomatous

tissue into a reticular structure, and within this reticulum the lime-salts are deposited; calcification being completed, they form the dentine. As the growth of the germ continues the papilla, assuming the form of the crown of the future tooth, impinges upon the enamel organ, which, depositing upon it forms a cap. The enamel organ begins to deposit lime-salts and calcify from dentine toward periphery.

The pulp corresponds at first with the dentine-forming portion of the germ, which, with the advance in the formation of dentine, becomes surrounded by this tissue until finally it assumes its proper position and form in relation to the tooth as developed.

From the fifth to the seventh month, the temporary or deciduous teeth being sufficiently advanced begin to erupt, the process continuing until the thirty-sixth month. The permanent teeth commence erupting at the sixth year and the process is completed about the twenty-first.

If we now examine the structure of the developed tooth, we find it consists of four parts—pulp, dentine, enamel, and cementum. The pulp, which forms one-third of the bulk of the tooth, occupies the central pulp-chamber and canal. It consists of a crown and radical portion; is of a reddish color, smooth on its surface, composed of a net-work of capillaries held together by connective-tissue and richly supplied with nerve-fibers, both medullated and non-medullated. The vessels at the lower portion of the pulp present a muscular coat, but as they near the periphery retain only their epithelial layer. Veins return the blood through the apex of the root. Immediately surrounding and in direct contact with the pulp are the odontoblasts, which are also continuous with the living matter contained in the canaliculi of the dentine. Proximal to the odontoblasts is the dentine. It is richly supplied with living matter, being twenty-eight parts organic; is traversed by canaliculi containing delicate living fibers, which are in direct contact with the living matter found between the enamel-rods, and also ramifying with the offshoots of the cement-corpuscles. Filaments pass out through the walls of the canaliculi into the basis-substance (glue-giving), anastomosing with one another, forming a net-work of living matter. In this basis-substance the lime-salts are deposited (principally phosphate of lime). Immediately around the canaliculi the basis-substance and lime-salts are more dense.

The enamel, which forms the cap or external covering of the crown of the tooth, has only three per cent. of organic matter in its structure. It is composed of polygonal rods, between which is the living matter, giving off delicate fibers, which enter the rods, forming a reticular structure, in the meshes of which the lime-salts

are densely infiltrated. The living matter is continuous with the dentine and at what is called the interzonal space is in excess. It is also in direct relation to the living matter in the cementum at the neck of the tooth. Covering the enamel is found (when in normal condition) an epithelial layer which is continuous with the epithelial layer of the gums, and which has received the name of "Nasmyth's membrane," in honor of the discoverer.

The cementum, which is external to the dentine, is very similar to compact bone; it is traversed by large cavities containing the active cement-corpuscles (bioplasm), and these canals as well as the corpuscles throw out branches which traverse the cementum in all directions, the living matter being continuous with that of the dentine, and at the neck of the tooth with the enamel; it is also continuous with the pericementum surrounding and holding the tooth in the alveolus, acting like an elastic cushion.

Thus it will be seen that exposure of the pulp is a strictly pathological condition, and treatment should be adopted subject to the reactions which are known to take place in living tissues.

The two great causes of exposure are mechanical injuries and caries. Exposure by mechanical means may result from the injudicious use of the engine-bur or excavator while operating, or from falls, blows, etc. Exposure by caries is the result of chemical and inflammatory action, acids being formed by the decomposition of food between and around the necks of the teeth dissolving the lime-salts of the enamel and exposing the living matter, irritating it, and causing an inflammatory action to be set up, governed by the amount of irritation and the more or less perfect calcification of the tooth-structure. As the inflammation continues the living matter swells, breaking down the lime-salts. The living matter of the dentine is in turn attacked, but more vigorously, owing to the greater amount of living matter present. This action progresses until the surface of the pulp is exposed, and, the irritation continuing, suppuration, ulceration, and death of a portion of the pulp, or new growth may result.

Exposures may be designated as either recent or long-continued; the latter may be subdivided into three classes: First, exposure having given more or less pain; second, suppuration, ulceration, and death of a portion of the pulp; third, new growth (fungus).

The treatment is conservative or radical. The objection to the devitalization of a pulp is that the living matter is in direct communication with it, and the tooth-tissue with the exception of the cementum is nourished by it. Thus in destroying the pulp we cut off life and nutrition from the tooth, and as a result the organic material decomposes, and gives off septic gases which pass through the apex

of the root and attack the surrounding tissues. The living matter of the cementum is also affected as well as the pericementum. Pericementitis may result, or a thickening of the membrane placing the usefulness of the tooth in jeopardy. Even should the best results possible follow, the tooth becomes discolored, owing to the decomposition of organic matter; it is liable to become sore and elongated by the thickening of the pericementum, or pericementitis may result, necessitating, perhaps, loss of the tooth by extraction.

On the other hand, by conservative treatment, the irritation may be subdued, cicatricial tissue may be formed, the odontoblasts surrounding the exposure may become calcified as secondary dentine, and by this reparative action a permanent and perfect capping may be formed and the tissues return to their normal condition.

A material to be used successfully in capping exposed pulps should be non-irritant to the tissues; an antiseptic should not undergo change by coming in contact with the pulp; should be easily manipulated and of a consistence capable of being made to perfectly occupy all the space at the orifice and surface of exposure, hermetically sealing it; should be a non-conductor of thermal changes; should produce no pressure on the pulp, and possess sufficient resistance to permit the introduction of a proper filling.

In the case of an adult presenting a recent exposure from which blood or serum may be oozing, the pulp having given no pain, remove carefully all decay, avoiding irritation of the pulp; then touch the point of exposure with wood creasote on cotton, allowing it to remain while preparing the capping. Antiseptic, sedative, and escharotic, this application corrects the septic influence of the air, coagulating the albumen at the point of exposure, and forming a protective cap, under which cicatricial tissue may be formed. Mix creasote and oxide of zinc to a creamy consistence, and by means of a ball burnisher place a small portion on the point of exposure; remove the excess of creasote with spunk, leaving only a thin layer to prevent direct contact of the pulp with oxyphosphate which is next to be placed over it, and which becoming crystallized protects the pulp from pressure. Oxychloride antedated the use of oxyphosphate and served a very beneficial purpose in conservative treatment, but owing to its irritating qualities its use has been to a greater or less extent superseded by the oxyphosphate, the latter being less irritating to the living tissues of the tooth with which it comes in contact. The oxyphosphate not being a non-conductor, a thin layer of gutta-percha should be placed over it in order to perfectly protect the pulp from thermal changes.

Gutta-percha both in a solid form and in solution with chloroform has been advised and used for capping exposed pulps, but when

applied in solution the chloroform evaporates and the gutta-percha contracts, leaving a space between it and the surface of exposure, allowing exudation, which causing pressure acts as an irritant, setting up an inflammatory action which if continued results in death of the pulp. The solid form of gutta-percha cannot be perfectly adapted to the surface of exposure; the same results follow as when applied in solution. The gutta-percha also absorbs moisture from the surface of exposure, and swelling, produces pressure,—in some cases where a large amount has been used sufficient to split the tooth.

In a case of long exposure, with more or less pain, the patient presenting with a cavity filled with foreign and decomposed matter, wash out the cavity with warm water and salt, which has a pleasant sedative effect; then apply creasote on cotton, over which place a temporary filling of pink gutta-percha and wax, equal parts, taking care to produce no pressure on the pulp, and allow this to remain from twenty-four to forty-eight hours; then remove the temporary filling, and if it has given no pain, cap as in recent exposure. If it has been attended with pain, treat again as before.

In the condition of long exposure resulting in suppuration, ulceration, and death of a portion of the pulp, remove the decay and dead portion of the pulp until bleeding occurs, which denotes living matter; then wash with salt and water; apply creasote and fill temporarily for from four to six days. If there has been no recurrence of pain, treat as in recent exposure. If the patient should return with pain, paint the gum with equal parts of tincture of aconite-root and tincture of iodine, which will relieve the inflammation by retarding the circulation and stimulating lymphatic action. If this does not cause the pain to subside, remove the filling, and probably a portion of the pulp will be found dead. If so, pursue the original treatment. If suppuration and death should extend into the canal of the tooth, clean away the decay until the living portion of the pulp is reached; saturate floss silk with creasote and place it upon the exposure in the canal, allowing it to extend into the pulp-chamber; place a piece of gutta-percha over the silk to prevent the contact of the pulp and oxychloride with which the canal is now to be filled to the pulp-chamber, making a solid foundation for the introduction of the filling. If trouble should at any time result, the oxychloride can be removed with the floss silk which was permitted to extend into the pulp-chamber.

In the case of long exposure a fungous growth, which is the result of long irritation, is found in the cavity as a granular mass attached to the pulp by a neck or pedicle. Saturate a thread of cotton or silk with tincture of aconite-root, carefully working it around the pedicle, and allow it to remain a few moments, to act as a local anes-

thetic. The mass can then be removed by the use of a sharp hatchet-excavator, and the operation will in this way be rendered nearly painless. Allow the wound to bleed until it ceases; then wash with salt and water; apply creasote and fill temporarily. After a few days, if no trouble follows, cap as in recent exposure. In some instances of long exposure, a condition of the pulp is met with in which little round bodies are found, in structure resembling dentine. They are the result of abnormal deposition of lime-salts, and are distributed throughout the pulp-chamber, sometimes extending into the canals, impinging upon the vessels and nerves, causing severe pain, retarding and finally stopping circulation, which results in death of the pulp. It is impossible to diagnose pulp-stones when they occur with the other pathological condition of exposure; therefore the treatment must be as in cases of common exposure.

In the cases of exposure in children, oxyphosphate cannot be successfully used for capping, owing to the greater sensitiveness of the tooth-structure, upon which the oxyphosphate acts as an irritant. In such cases resort may be had to creasote on cotton, and over this a platinum convex cap, which will prevent any pressure on the pulp. Over the platinum place a thin film of gutta-percha to act as a non-conductor.

Exposures in wisdom-teeth are treated similarly to those in children's teeth.

A NEW ARTIFICIAL TOOTH-CROWN.

BY W. STORER HOW, D.D.S.

(Continued from page 181.)

In mounting a crown on the bicuspid root (Fig. 15), the chucks will not usually pass the natural cusp, and hence both the drill and the tap must project the cusp's length in addition to the gauge length. Observe also if the space between the tap, and the cusp, is wider than the thickness of a crown-pin, and if not cut the cusp vertically with a large fissure-bur so that the space shall be wide enough, before setting the post, else the bent pins will not pass between the post and cusp. Grind the rib—see step 10—quite down to the floor of the crown; take steps 11, 12, and 13, and if the occlusion necessitates the grinding of the crown so far as to destroy one pair of pins, then invest the crown, and solder the pins together at the lap, taking step 15 for completion.

When it is desired to contour the backing of a cuspid crown to form an inner cusp, or to adapt a cuspid or incisor crown for masticating uses, the pins may be twisted together over the mandrel, and again twisted tightly over the post as in Fig. 17; but in some cases

it may be better to bend the neck-pins, as in Fig. 18, instead of twisting them. In all cases the bent pins are to be pinched quite hard over the mandrel and post, so that the serrations of the pliers will roughen the pins to prevent their being pulled through the backing, which should also be carefully condensed around the pins and post.

If the root is not ready for permanent mounting, use a tubular post, and in the absence of a threaded tube, take the successive steps up to 13; then back temporarily with wax, rubber, or gutta-percha, awaiting the next sitting, when the crown may be taken off, the post unscrewed, and the remedy applied. Thus the root may be alternately medicated and mounted until ready for the permanent crown.

When the root is much decayed, the bottom of the cone-shaped cavity may be drilled and tapped to the depth of a sixteenth of an

Fig. 17.

Fig. 18.

Fig. 19.

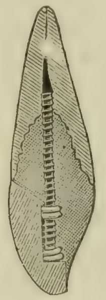
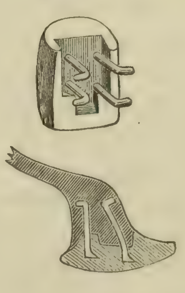


Fig. 20.



inch, and the post, thus anchored, may be further secured by cement in the grooved walls of the cavity and around the post (Fig. 19).

These crowns afford unusual facility for mounting by any of the well-known methods of inserting the post, after soldering it to the crown. They are also adapted for use in celluloid and rubber work, especially in cases of single teeth. The several long pins, having their ends bent with pliers at a sharp angle (Fig. 20), may be so arranged as to both strengthen the shank of the plate and hold the crown very firmly in position.

The screw-posts are made of crown metal, an alloy devised for the purpose in order to obtain a stiff post that will permit the cutting of the peculiar and extremely accurate thread formed upon it, and which will not amalgamate or be otherwise affected by any backing-material that may be used. Of course, platinum or platinum alloyed with iridium may be employed for posts, but the crown metal is in every way superior.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

(Continued from page 194.)

Dr. A. H. Brockway. I think very highly of the paper just read by Dr. Perry, possibly for the reason that the method of practice described therein corresponds very nearly with that which I have followed in the past few years.

I well remember that in the early days of my practice the treatment of pulpless teeth was always undertaken with a great deal of hesitation and with pretty lively anticipations, based on sad experience, of possible trouble in the near future. Nor have I any reason to suppose that my experience was at all singular, or unusual with the practitioners of that day; but I can say that now the management of such cases gives me little trouble, and that they are undertaken with a confident expectation of a favorable result.

In my opinion the whole secret of successful treatment lies in the thorough cleansing and disinfecting of the root and the subsequent thorough filling of the same, and I know of no other method of filling a root which is equal to that described in the paper: it is simplicity itself.

I have usually been somewhat cautious about using creasote or carbolic acid at the first dressing of a pulpless tooth, especially if there was a great deal of putrid matter found in the root. I prefer to give it as thorough a cleansing as is possible by means of hot water or alcohol, usually relying mainly upon hot water. I have used for a disinfectant with good success oil of eucalyptus and also a solution of permanganate of potash.

The practice of filling roots with cotton on the ground that it is so easily removed has always seemed to me to be a faulty one, because it invites the very trouble we are trying to escape, from the fact that its porous nature permits the infiltration of putrefactive material through the foramen or possibly through the structure of the tooth itself.

I believe that if thorough cleanliness and thorough disinfection are pursued and the root filled in the manner described in the paper, the necessity for removal will almost never occur.

Dr. Lord. Will Dr. Brockway please tell us his objections to using a solution of carbolic acid or creasote for the first dressing?

Dr. Brockway. I have the impression that it might carbolize the abluminous contents of the tooth, and render them more difficult of removal by sealing up the ends of the dentinal tubuli. I know that I have sometimes had trouble where I used it in this way, and that I almost never have trouble when I do not so use it.

Dr. Rich. I did not hear the whole of Dr. Perry's paper, but that part of it which I did hear certainly described a very admirable method of filling the roots of teeth where they can be filled. It is always a dangerous matter to attempt to ream out the root of a tooth. So far as we know anything about it the irregularity of the canal and the irregularity of the tooth itself and the thickness of the dentine surrounding the canal, make it always a very difficult matter to attempt to ream it out. The method that I have employed for disinfecting the roots of the tooth and in many cases bringing away portions of the contents, has been to use splinters of very dry, soft wood. I have always been much opposed to the use of carbolic acid or creasote in the treatment of pulpless teeth.

The action of carbolic acid or creasote in turning the gelatinous portions of whatever may be found in there into an insoluble compound is one of the objections I have to its use under any circumstances. We have now, very fortunately, a material that is very much more efficient as a disinfectant,—permanganate of potash, which will entirely disinfect any substance that may be left in the pulp-canals.

There are several methods that I have employed in filling the roots of teeth. One, which is very like this of Dr. Perry's, is to take some clear and thin pine wood, work it down to almost a sharp point, dry it carefully and plunge it in boiling paraffin, which will saturate the wood. When treated in that way this wood is almost indestructible under any circumstances, and being always stiff, after you have ascertained the extent of the canal, it is very easily pressed into place; if made of soft pine it will accommodate itself to the inequalities of the nerve-canal and make an almost perfect fit. I have tried some experiments with wood saturated with paraffin that way, and found it was almost impossible to have any substance pass between the plug so put in and the dentine of the tooth.

I think it is a very important matter that we should always disinfect the dentine itself before we fill the root. Now, if you introduce carbolic acid or creasote at all it is almost impossible for you to reach that dentine. You are placed in a position where you can do nothing with it. You have made the substance with which it is saturated insoluble by anything except a very highly rectified spirit, or something that will dissolve creasote itself, which is very difficult of introduction into those channels. By the proper use of the solution of permanganate of potash carried down into the root with a thin fiber of wood or with a steel instrument, it is very easy to disinfect it entirely. The measuring of the canal to ascertain its length, and the opening at the foramen and everything of that kind have been described many times; although the method of Dr.

Perry, of taking an impression with those little points of gutta-percha, is certainly very ingenious.

The treatment of nerve-canals, since the introduction of permanganate of potash, has become a very simple matter with me, but I hold it to be absolutely indispensable that the whole of the dentine should be thoroughly impregnated with the permanganate.

I have a number of very small gold tubes, as small as I have ever seen, that are attached to small syringes, with which I sometimes force it down till I am very certain it has reached the apex, and perhaps has passed through, but the permanganate of potash will do no injury in this case, scarcely ever producing inflammation or even irritation.

I think the whole method of Dr. Perry is most admirable, particularly that principle which he endeavors to inculcate, that fillings that are put in nerve-canals should always be capable of easy removal.

Dr. Perry. Do those wood fillings, after swelling up, become difficult of removal?

Dr. Rich. No, sir; they ought to be left projecting out some distance. The thorough saturation of the wood-fiber with paraffin makes it almost indestructible; but it must be plunged into the paraffin when it is very hot.

Dr. Perry. Could it be withdrawn even if a portion was left exposed?

Dr. Rich. Oh, yes; the strength of the wood is very nearly retained. Paraffin makes it impervious to moisture; it does not expand. No moisture can get at it if it is properly saturated.

Dr. Brockway. My attention has recently been called to a new agent which may possibly prove of use to us in such cases. It is an article called Listerine. I think it is not in market yet to any great extent, and I have used it so little that I am not prepared to say much about it. It seems to promise to be a very useful agent. One advantage it will have, it is quite innoxious; it can be taken in considerable quantities—a teaspoonful—without injury.

Dr. Rich. Is it a disinfectant?

Dr. Brockway. It is an antiseptic, and I presume to some extent a disinfectant, but its main quality is as an antiseptic.

Dr. Rich. It is very important in the treatment of nerve-canals, after they have been cleansed of the pulp, to have them thoroughly disinfected, and with a substance that will not be injurious and cause inflammation. Now the great objection to creasote or carbolic acid is the amount of inflammation which it may cause and the fact that it does not entirely cleanse the dentine from the impurities that it has received, particularly when the pulp has been long devitalized.

Dr. Howe. Dr. Rich, tell us how strong a solution of permanganate of potash you use?

Dr. Rich. It wants to be about the color of a rose leaf,—about the color of a light rose leaf, not a deep red. I don't know that it would do any harm; it is not at all a dangerous substance to take. I have administered it to persons who have had foul mouths without any disagreeable effect except a slightly astringent one. It is perhaps the very best disinfectant that we have, and it is very easily applied. It is well in the treatment of nerve-canals in this way, that we should remove all the moisture we can before the application of permanganate of potash. This is very easily done by injecting into them absolute alcohol, which will displace all the water that may be in the dentine, as you all know it will in any other porous substance. The alcohol evaporates very readily, and when the permanganate of potash is injected or applied, it enters the structure of the dentine almost immediately and operates with great effect in the absence of water in that structure.

Dr. Lord. Would Dr. Rich use that in the beginning of the cleansing of the nerve-canal?

Dr. Rich. I would use it immediately; I would endeavor to have the nerve-canal disinfected as soon as possible.

Dr. Northrop. I hardly expected to make any remarks upon this subject after hearing Dr. Perry's paper, and hearing the good success that he always has had in his method of treatment, but since Dr. Rich has spoken it has given me a little courage. For a long time I have preached against the use of carbolic acid and creasote in a tooth in which the pulp was devitalized.

To all with whom I have talked upon that subject I have said: "Never use carbolic acid or creasote upon opening a tooth where the pulp is dead." After using permanganate of potash to syringe it out with, I penetrate far enough to clean the canal perfectly; I use spirit of camphor. I would say that when I open a tooth where the pulp has been dead for a long time I very seldom attempt to cleanse it perfectly at the first sitting, for, in extracting teeth of that character where they have been broken down, I have almost always found an abscess at the end of the root, or at least a thickening of the periosteum, showing that it was in an unhealthy state; and finding it in that condition I have thought that if I penetrated the root to the apex, trying to make a perfect cleansing of it before I had got it under treatment at all, I was very liable to get an irritation that would end in an ulceration and suppuration of the tooth or the periosteum; and therefore, as I have said, I very seldom make, or try to make, a perfect cleansing, if the root is filled with decayed matter, at the first sitting. Almost always the

dressing that I put in is camphor, after using permanganate of potash.

For the filling of the roots of teeth, I think I can say with Dr. Perry, and with nearly every one who has been in practice any number of years, that I have tried a little of everything that has been used. Anything that has come up that has appeared to be good and new, I have tried. I have filled with oxychloride of zinc, I have tried to fill with oxyphosphate; some sixteen years ago I filled with chloroform and gutta-percha, and one great difficulty I found in using that Dr. Perry has very cleverly expressed,—it was "slobbery;" it would adhere to the instrument, was very apt to work air into the root and make mischief thereby.

At the present time I think that gutta-percha, used in the manner described by Dr. Perry, is one of the best fillings that is put into the root of a tooth.

Dr. Perry. Without any actual knowledge of the use of permanganate of potash, I am quite willing to accept the ideas of Dr. Rich and Dr. Brockway with regard to its efficiency. If my "theory" is correct, it should be one of the best remedies we can use. I believe that camphor is also one of the best germ-killers we have, and I should expect the good results which Dr. Northrop gets from it. If one has a feverish condition of the mouth or stomach he cannot take anything that will give him more comfort than camphor in some form or other.

If the idea is correct that we have in the canals of the tooth material which is well suited to germ-life, why should not creasote and carbolic acid after all be suitable remedies? The criticism is a very good one, that it will form a partly insoluble compound at the open ends of the tubuli, which will prevent the thorough cleansing of the dentine. You all know how full of vile matter, if I may use the term, dentine is. You can always tell how full it is by the odor, if you will run your engine-bur through it rapidly. Now it is just as fair to assume that the tubuli are filled with the germs of bacteria as that the pulp-canal is filled with them. If permanganate of potash or camphor can be absorbed into the tubuli themselves without closing the foramen, these may be the best remedies to use; yet the eating of the pudding is the best proof of it, and if creasote or carbolic acid is not so well suited for cleansing the roots, why don't I see some bad results?

Dr. Rich. I think that so far as we attempt anything in our profession it should be on thoroughly well-known scientific grounds; we should never go blindly to work about anything. We all know that a large portion of the contents of these tubuli is gelatinous, and we know that by the application of creasote they are sealed up

instantly with a very thin fiber of it, and the purification of the dentine after this application is impossible. Now, why not use a substance that is sure to penetrate that dentine, and sure to disinfect it and destroy its germs? Permanganate of potash is a certain destroyer of germs wherever it reaches them. It is a destroyer of all substances that are capable of decomposition.

One objection that I should have to the use of camphor, except in the form of camphor-water as prepared by the American formula, is that wherever it comes in contact with water it is at once precipitated into the form of a softish kind of gum.

There is no doubt about the purifying properties of camphor, but I doubt myself if, when it is brought in contact, it has sufficient power to overcome the matter that is in the tubuli of the dentine. A few experiments made with porous wood or porous bone and permanganate of potash will satisfy anybody that it is the most valuable disinfectant we have for the purposes for which we want to use it about the teeth.

Dr. Brockway. I would not like to seem to question Dr. Perry's theory in regard to the cause of trouble in cases of pulpless teeth. I think I quite agree with him. Whatever may be the theory held, I am satisfied for myself that the treatment should in the first place be cleansing, for which I use hot water; in the second place it should be disinfecting, for which I use permanganate of potash; and in the third place it should be antiseptic, for which I use carbolic acid or creasote. I hesitate to use the antiseptic treatment at the first dressing, usually for the reason named, that I fear to seal up the putrefactive substance in the tubuli of the teeth or to seal up any that is beyond the foramen.

Dr. Rich. There is a question sent here [reading] "After using permanganate of potash is there any objection to using creasote or carbolic acid?"

Now, permanganate of potash has a quality of turning all gelatinous matter that may be in the tubuli into an incorruptible substance; that is one property it has. In the first place, before the carbolic acid can be applied with any chance of its being successful we must have these tubuli thoroughly cleansed of every other substance, and I fail to see the value of carbolic acid, because after using it we cannot get into these tubuli at all; it will stop them up right at the mouth.

Dr. La Roche. But after the tubuli were thoroughly disinfected the carbolic acid would do no harm?

Dr. Rich. How are we going to get it into the structure of the dentine? How are we going to get that creasote beyond the mouths of the tubuli, even if we disinfect them. Of course if we

could get all those tubuli saturated with carbolic acid and keep it there, it would be a very powerful disinfectant, and harmless if it did not go through and produce irritation on the outside.

Dr. La Roche. I have used carbolic acid and creasote for the last eight or nine years and I have supposed that after we had disinfected the tooth with permanganate of potash this would act a good deal as it does in preserving meat. I thought that was a very good way of doing it.

Dr. Perry. I am never happy without a theory; and you see I have Dr. Rich committed to this one because he said that permanganate of potash was one of the best germicides that we have. Now what does he think in reference to my idea of germs throughout the tubuli as well as in the contents of the pulp-canal?

Dr. Rich. Well, if I am asked that question I cannot but think that the investigations of science are proving every day that all these conditions are the result of germs that are progressing to life all the time, and that are more or less destructive, according to their development. The theory is becoming very general that some of the most fatal diseases to which the human system is subject are occasioned by germs, and can be easily controlled if you can reach them.

The following paper on "The Best Form of Screw, and its Use in Retaining Fillings," was then read by Dr. J. Morgan Howe:

The use of screws, for retaining filling-materials in teeth which have lost more or less tissue by decay, is probably held in various estimation, now as in the past. A mechanic cannot fail to appreciate the value of screws for all purposes of anchoring, retaining, or binding together materials whose structure is adapted to their use; but in operative dentistry, no doubt all of us have witnessed sad failures which seemed due to a reliance upon screws, which had in some way failed to serve that purpose in the dentists' hands which they so well fulfill in those of other artisans. One principal cause of failure has been the lack of adaptation in form and arrangement of threads of all screws heretofore made for our use. Dr. J. B. Rich deserves the credit of having made the suggestion in one of our meetings about a year ago, that the screw for our use, should be made on the model of the common wood-screw. If we consider the matter carefully, I think we must conclude that this is undoubtedly the best form. In order that they shall best serve their purpose screws should be constructed with reference to the relative strength and toughness of the material in which they are to be used. Those intended for metal work are of course not made the same as those to be used in wood. The elevated threads and the grooves between

them in the metal-work screw are the complements of each other, because the counter-thread in the metal receiving the screw is of the same, or of nearly equal strength. The wood-screw has narrow, sharp threads, separated from one another by comparatively wide spaces, the latter to be occupied by as large a quantity as possible of the relatively much weaker material. Dentine—especially that of pulpless teeth—is a very much less strong and tough material than that which we use for screws, and yet all screws made for our use of which I have any knowledge have been constructed as if made for metal work. Some attempt has been made to improve upon the older forms, with the fine threads of the Stubs and the French screw-plates, by increasing the size of the threads, and by just so much, the distance between them. This is a decided improvement, but it is necessarily attended with a great weakening of the screw itself, the V-shaped depressions between the threads being cut into the metal more deeply in proportion as the thread is increased in size. In this way the screw is weakened inversely in proportion to its diameter. A screw constructed like a wood-screw is much better, because in such a one the thread is raised up from a plain cylindrical core, the latter being retained as nearly as possible the full strength of the wire, and the thread, small and sharp, is of more nearly equal strength to the relatively larger amount of dentine included between the widely separated threads.

I have the pleasure of offering for your inspection this evening some screws I have made in accordance with these principles of construction. Some of them are on the model of the wood-screw, and others not exactly like it, but with a wide V-shaped depression, not cut very deeply into the body of the wire, so that its strength is retained, and all of them including a relatively large amount of material between the threads when put to service. Those made like wood-screws are the best. There are also one or two made on the Stubs screw-plate, for comparison merely. I believe this form is a great advance on anything we have had heretofore.

The dies from which these screws were made, are the result of several trials in this line of work and can now be obtained of Montgomery & Co., of 105 Fulton Street, N. Y., who made them for me.

I think that like many other valuable things screws have been used in many cases to no good purpose, and many times to the positive injury of teeth. I have not changed the opinion, before expressed, that the pulps of teeth do not tolerate the irritation consequent on the drilling of pits in the living dentine as well as an equally near approach to the pulp by the slow encroachment of caries, the physiological reasons for which will readily suggest themselves; hence the practice of attempting to retain fillings by retain-

ing-pits filled either with gold or with metallic screws, is in the case of teeth with living pulps an unfortunate and hazardous one. I have seen quite a number of teeth which seemed to me to have had their pulps devitalized by the irritation consequent on this method. As a rule, cavities in teeth can be shaped and prepared so as to permanently retain the filling-material placed in them without either screws or retaining-pits for gold, and *in the case of living teeth should be so prepared.* In saying this, I do not deny the need of sometimes making very small pits to retain the first few pieces of gold. These are not for the retention of the filling, but only for the purpose stated, and need to be only very small and shallow. There are also some exceptions to be admitted in some living teeth which have been broken or worn down, and into which pits for screws or retaining-pits of gold may be made in some cases without a dangerous approach to the pulp. Whenever the use of screws seems to be a necessity in living dentine I would recommend that those made of platinum alloyed with iridium be used instead of gold.* In this way will be modified one of the principal sources of danger to the pulp, as gold is one of the best, and platinum one of the poorest metallic conductors of heat.

There are many pulpless teeth constantly presented for treatment which have been wasted by caries till the walls are frail and thin, or they have been broken, and frequently there is but one wall or a part of the side of the crown left. These conditions are the result frequently of the patients own neglect to secure proper attention in time to avert such consequences, but theirs is not always the blame. Dentists, many of good standing and reputation, and enjoying lucrative appreciation from the public of their position—not their practice—are responsible in a great degree for this deplorable condition of the teeth of some who have tried to care for them, and have sought with fair frequency professional advice and attention. I plead for more thoroughness in the treatment of teeth in the early stages of decay, and thus the prevention of at least some of these almost hopeless cases. The history of many of these teeth has been, filling, decay, and refilling until but little of the teeth remains to fill, the patient meantime suffering from pulp-irritation, congestion, and pulpitis, till pericementitis and abscess are reached. Such a record as this is not as uncommon as it should be, and might be more rare, if there were fewer hurried operations. One of the most prominent causes of badly broken teeth is, I think, the use of gutta-percha for filling badly decayed pulpless teeth. Such teeth require time and

* I formerly used screws of steel, to some extent, but found that the surface corroded in the root, and consequently might finally lose its hold.

skill to fill with a material of sufficient hardness to afford support to the frail walls, and although gutta-percha compositions have well-known qualities, making them admirable materials for the arrest of decay, yet their use in this class of cases is, I think, contraindicated, because they have not the hardness requisite to fulfill the demands on a filling in such teeth. Pulpless teeth that have lost much of their structure by decay will generally, sooner or later, break unless special precautions are used in the preparation and filling of them to prevent such a result,

As an illustration of the deterioration in strength of the dentine of pulpless teeth, I have passed around for your inspection a bicuspid crown which came into my possession a few days ago. You will notice that it has broken through a thickness of dental tissue equal probably to two-thirds of the entire tooth-structure at the neck. "The prudent man forseeth the evil," and as for this particular kind of evil, the prudent dentist will undertake to avert it. It is mainly—though not invariably—in the treatment of pulpless teeth, that I think the principal utility of screws exists for retaining fillings and preventing subsequent breakage of the walls of the crown.

Whenever the dental tissues have been much wasted by decay at or near the cervical portion of such teeth—especially in the case of bicuspids and molars—a sufficient portion of the tooth-structure should be cut away to allow a screw to be firmly set in one of the roots. The cusps of the tooth should be cut short enough to prevent the liability of lateral motions of the jaw causing undue strain through the cusps of the opposing tooth, and, when the walls of the tooth under treatment are very frail and thin, the filling-material should be built up over the edges of these walls, so as to prevent any contact with the opposing tooth or with food. The screw will, in such cases, aid materially in retaining the filling and in giving additional strength to filling and tooth-structure to withstand lateral strain in mastication, and the treatment indicated, in preparation and filling, will, in most cases, prevent the breaking of the whole or portions of the crowns of these teeth.

In the effort to restore broken-down tooth-crowns to usefulness, I count on the screw as my stronghold. After filling the apical end of the root as perfectly as possible with oxychloride of zinc, gold, or tin, I cut the open portion of the root-canal of one root to a uniform bore with a drill of slightly less diameter than that of the screw to be inserted, drilling generally from one-third to two-thirds the length of the root. When I am ready to introduce the filling-material, I put the screw—which has been previously made of suitable length—firmly in place, letting the thread of the screw cut its own way in the dentine. The filling-material is at once packed,

and, if necessary, built up over the walls, which have been prepared with that object in view. I believe that by the more frequent resort to such preparation and restoration of pulpless teeth as is here indicated, they would be much more useful and enduring than is sometimes the case, and even when the tooth-structure appears so thick and strong as to need no support for itself, the retention of a filling could frequently be made much more sure by inserting a screw in one root, than it would be if the dependence be placed only in walls of devitalized dentine and enamel.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

The regular meeting of the Odontological Society of Pennsylvania was held at the residence of Dr. Daniel Neall, 1627 Summer Street, December 2, 1882, the president in the chair.

Dr. F. M. Dixon read a paper on "The Prophylactic Properties of Tin."

Discussions.

Dr. James Truman. I indorse most fully all that Dr. Dixon has said in regard to tin, having regarded it throughout my professional life as one of the most valuable filling-materials we have, when used under certain conditions. Increased experience simply confirms the conclusions of the past, and to me it is surprising that so few realize that this metal, properly prepared, possesses advantages, in a certain class of cases, not found in any other material. If properly manipulated it can be made of a density sufficient to resist all ordinary wear from attrition, and in its power of resisting caries it has few equals and no superiors. Inquiring at the dental depots I find the demand very limited. This is probably due to the fact that its use requires the same skill and time in packing as cohesive gold, as it must be manipulated in the same way as the latter to produce the best results. Amalgam has, therefore, taken its place in the practice of the majority, and the mode of manipulation of tin promises to become a lost art. That this is a serious mistake is very clear to those who have made the most use of this metal. The idea that it will not answer for masticating surfaces is a very erroneous one, as I have seen it in numerous mouths in constant wear for many years without appreciable loss. As a base for gold, a sheet of tin and one of gold is regarded by some of the European dentists as having a greater power of resistance to decay than when gold is used alone. Whether this is true or not, the great value of this combination of tin and gold cannot be successfully disputed. It has also a valuable place as a lining for sensitive cavities, and if properly manipulated

around the walls will very effectually guard the irritated tissue from thermal action, a most important matter, especially in young teeth. The facility with which this metal can be condensed on the cohesive principle in presence of moisture renders it of service in those cases where moisture cannot be wholly excluded. Fillings inserted damp seem to result very satisfactorily.

Dr. Buckingham. Gold fillings fail on account of defective manipulation, because the gold is not well adapted to the surface of the cavity. The preservative properties of tin depend upon the lead in it. If it was pure it would not turn black, the oxide of tin being white. Tin foil often becomes oxidized in the books before it is used. Children's temporary teeth should be filled with tin; it is better than amalgam and as good as gold. Electricity as a current has nothing to do with decay under a filling. When a filling in a tooth sets up electrical action it is only local.

Dr. Register. The fundamental principles underlying the treatment of diseased teeth are not, as a rule, appreciated. Fully fifty per cent. of the fillings inserted are utter failures; twenty-five per cent. more do but temporarily check decay. I believe that not more than one-quarter of all the fillings inserted act as curative agents—not more than that proportion which do not require refilling inside of from ten to twenty years. Dental caries is no chance condition, nor is it, as a rule, to be checked by chance, although this does happen occasionally. If our aim is to be useful in restoring lost parts, the filling-material must be compatible with the individual tooth-tissue, in order to be tolerated, and the adaptation must be perfect. Vital dentine has the power of recuperation, and when properly protected the tooth is again as strictly normal as any tissue which bears the marks of a cicatrice. Tin is a good therapeutic and prophylactic agent, for the simple reason that it is capable of easy and perfect adaptability without injuring the tooth-structure. The most perfect cohesive gold fillings return to their maximum hardness, the artificial physical condition of the gold not being permanent. In six months a filling of this kind will be no harder than if made of soft foil in a perfect manner, and as a rule it is not so perfectly adapted. The weld should be confined to the enamel walls only. With soft gold foil worked with proper instruments we get the same condition as with tin, with a more pleasing appearance. I use them both in the shape of cylinders and tape; but there are conditions of tooth-structure and also difficult positions, where neither the mallet nor hand-force is desirable upon an unyielding material. In such cases I have had the most satisfactory results with the combination of gold and alloy. A perfect filling can be thus made and contoured in the most

difficult place, and the organ restored to its normal condition.

Dr. Guilford. I have been entertained and instructed by Dr. Dixon's paper. The value that he places upon tin as a filling-material, both in its mechanical and therapeutical aspects I consider none too high. He has found it so in his practice and I have in mine. I think we have all been more or less demoralized by amalgam through the prominence that has been given to it in the past ten years. Amalgam excels tin in one quality only, that of hardness or resistance to force in attrition. In all other qualities tin is the peer of amalgam, and yet how seldom do we hear it spoken of and still more seldom do we see it used. More than this, tin has never had justice done it in regard to hardness. It wears longer than we generally give it credit for. In the earlier years of my practice I used tin a great deal and was always pleased with the results. I have used it less in later years, only because I could manipulate amalgam more quickly. Of course, on large masticating surfaces or for building up, amalgam should be preferred to tin; but in small crown cavities where we do not want to use gold, on buccal surfaces and in cavities difficult of access, and on approximal surfaces, tin is often superior to all other metallic fillings. Its extreme softness, ease of manipulation, adaptability to walls, ductility under the burnisher, low conductivity, and therapeusis by oxidation make it an excellent material for the filling of teeth. For the repair of any metallic fillings in out-of-the-way places it is by far the best material we have. I am glad the essayist has brought the subject to our notice again, and I feel convinced that if we were all to use this material more than we do, we would further the best interests of our patients and ourselves.

Dr. Darby. For many months past I have been in the habit of using gold and tin in combination in the same tooth. My method of using it is to take a leaf of gold and place upon it a leaf of tin foil; the two are then folded twice and cut into strips. The tin is hidden from view but comes to the surface as the two are consolidated. In my clinic this afternoon at the University I selected a very large cavity situated on the masticating surface of an inferior molar. Into this cavity was packed about two leaves of gold and two of tin. When the surface was approached I used gold alone that the appearance of the tin should be prevented. The operation required much less time than would have been necessary to make the filling entirely of gold, and in my opinion is just as good, if not better. The combination was not made with the hope of obtaining any beneficial result from the tin, but simply to demonstrate to the class the method of using the metals in combination. I do believe, however, that had the cavity been on the approximal surface of the

tooth, and the tin and gold, used at the cervical border of the cavity, it would have been productive of good results in consequence of the chemical change which takes place when two dissimilar metals are used in combination.

Dr. Daniel Neall. I never expect to go back to tin. I jumped from gold to amalgam long ago. Give me the gold we had from 1848 to 1862 and I can put it anywhere that you can put tin; such gold was "as soft as butter and as tough as hemp," to quote an old dentist. You cannot pack gold nor tin into obscure cervical cavities as you can amalgam, and as regards union, or assimilation, or therapeutical effect, I should as soon trust it as tin.

Dr. Bonwill. There is not a dentist of any character who did not in his early practice resort to tin when for various reasons gold could not be used, and who did not refuse to use amalgam when anything else could be made available. No one ever doubted for an instant the value of tin as a preventive of caries, nor its influence upon the peripheral borders of the cavity. Men have time and again exhausted their patience and energies in the use of tin and gold rather than use amalgam, from the fear of the public or from prejudice. I attribute the true preservative qualities of tin to its easy adaptability to the walls of the cavity and its low conductivity, rather than to any compatibility with dentine. During the first eight years of my practice I did not use an amalgam filling. I took the same trouble to pack tin as I did gold, and with happy influence upon the tooth so far as caries was concerned, but it did not last; its contour would change. Tin can be packed with sharp-pointed instruments and be made to weld apparently as solid as gold foil; even wet tin fillings in grinding surfaces allow of no further decay. Its soft nature admits of absolute contact with the walls, and when this is secured, I do not care whether it be gold, tin, or amalgam that is used, a filling will be successful. When there is no capillary tube between dentine and filling, caries will not again commence at that point unless decay has not been removed or the margins have not been carried over far out of the way, where decomposing substances cannot remain at the margin of the filling and dentine. It is the observance of mechanical details, from the preparation of the cavity to the proper shaping of its peripheries, the outline of the filling, and the relation it bears to surrounding tooth-structure, rather than the material which is used, that makes one filling more than another a better prophylactic against caries. If we could control our patients and keep all cavities within a certain radius, observing decay before it has so far progressed as to involve too much structure, we could often use tin; but why not use gold? In such cavities it requires no more labor nor is it more difficult to place soft gold foil. I

cannot understand how any one who has approximo-grinding surface fillings to insert, needing all the support he can possibly give them, can afford to forsake gold for tin. In such cases we can do greater justice to our patients and to ourselves by the use of amalgam.

AMBLER TEES, D.D.S., *Recording Secretary.*

ALABAMA DENTAL ASSOCIATION.

THE fifteenth annual meeting of the Alabama Dental Association was held at McDonald's Opera House, Montgomery, Ala., April 10, 11, and 12, 1883. Dr. J. C. Johnston, president, in the chair.

The following officers were elected for the ensuing year: Dr. E. S. Chisholm, president; Dr. R. U. DuBois, 1st vice-president; Dr. W. R. McWilliams, 2d vice-president; Dr. E. Wagner, secretary; Dr. G. M. Rousseau, treasurer; Drs. E. S. Chisholm, E. Wagner, S. Rambo, W. D. Dunlap, and A. Eubank, executive committee; Drs. W. R. McWilliams, A. Eubank, J. C. Johnston, W. B. Stewart, J. G. McAuley, State board of dental examiners.

E. WAGNER, D.D.S., *Secretary*,
Montgomery, Ala.

SOCIETY OF THE ALUMNI OF THE DENTAL DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA.

THE third annual meeting of the Society of the Alumni of the Dental Department of the University of Pennsylvania was held in the Medical Hall of the University, April 13, 1883. The following officers were chosen for the ensuing year: Dr. H. L. Reinecke, president; Dr. E. P. Hawes, 1st vice-president; Dr. H. S. Wiggins, 2d vice-president; Dr. S. D. Sinclair, 3d vice-president; Dr. C. T. Howard, corresponding secretary; Dr. J. H. Campbell, recording secretary and treasurer; Dr. V. M. Smith, orator; Drs. J. E. Harlan, J. R. Yorks, J. P. Winner, G. L. Curtis, H. B. McFadden, executive committee.

CHARLES T. HOWARD, *Corresponding Secretary*,
127 E. Main St., Rochester, N. Y.

DENTAL SOCIETY OF THE STATE OF NEW YORK—CORRECTION.

THE fifteenth annual meeting of the Dental Society of the State of New York will be held at Geological Hall, State Street, Albany, N. Y., on Wednesday and Thursday, May 9 and 10, 1883 (not June 12, as stated in the April number of the DENTAL COSMOS). The Board of Censors of the society will meet at the Delavan House on Tuesday, May 8, at 10 o'clock A.M.

J. EDWARD LINE, *Secretary.*

ILLINOIS STATE DENTAL SOCIETY.

THE nineteenth annual meeting of the Illinois State Dental Society will be held at Decatur, Ill., commencing Tuesday, May 8, 1883, and continuing four days.

A cordial invitation is extended to members of the profession in this and adjoining States to be present. An interesting session is anticipated.

EDMUND NOYES, *Secretary*, Chicago.

The Illinois State Board of Dental Examiners will meet at the new Demming House, in Decatur, on Monday, May 7, 1883, at 9 o'clock A.M. Candidates for examination must present themselves at that time.

GEORGE H. CUSHING, *Secretary*, Chicago.

NEBRASKA STATE DENTAL SOCIETY.

THE seventh annual meeting of the Nebraska State Dental Society will convene at Lincoln, Neb., on Tuesday, May 22, 1883, and continue in session two days.

W. F. ROSEMAN, *Secretary*, Fremont, Neb.

MAD RIVER VALLEY DENTAL SOCIETY.

THE second meeting (since its reorganization in October last) of the Mad River Valley Dental Society will be held at the Phillips House, Dayton, Ohio, on Tuesday, May 22, 1883, commencing at 10 A.M., and continuing during the day and evening.

W. H. SILLITO, *Secretary*,
Xenia, Ohio.

AMERICAN DENTAL SOCIETY OF EUROPE.

THE American Dental Society of Europe will hold its eleventh annual meeting at Cologne, commencing on Tuesday, August 7, 1883, at 10 o'clock. Special efforts are being made to make the meeting interesting and profitable. Members of the professiou who may be intending to visit Europe during the summer are very cordially invited to be present.

W. D. MILLER, *Secretary*,
2 Hausvoigtei-platz, Berlin C.

AMERICAN MEDICAL ASSOCIATION—SECTION ON DENTAL AND ORAL SURGERY.

The thirty-fourth annual session of the American Medical Association will be held in Cleveland, Ohio, commencing Tuesday, June 5, 1883, at 11 A.M., and continuing four days.

"Delegates shall receive their appointments from permanently organized State medical societies and such county and district medical societies as are recognized by representation in their respective State societies, and from the medical department of the army and navy and the marine hospital service of the United States."—Extract from by-laws.

All medical men of the regular school practicing the specialty of dental surgery are cordially invited to procure credentials from their local medical societies and join us at Cleveland. Railroads furnish medical rates to all members wishing to attend.

"A member desiring to read a paper before any Section should forward the paper or give its title and length (not to exceed twenty minutes in reading) to the chairman of the Committee of Arrangements, at least one month before the meeting." —Extract from by-laws.

TRUMAN W. BROPHY, *Secretary of the Dental Section*,
Chicago, Ill.

ASSOCIATION OF AMERICAN MEDICAL EDITORS.

The next annual meeting of the Association of American Medical Editors will be held in the City of Cleveland, Ohio, simultaneously with that of the American Medical Association, on June 5 and 6, 1883.

The subject of the address to be delivered by the president, Dr. N. S. Davis, Chicago, is "The Present Status and Tendencies of the Medical Profession and Medical Journalism." A free discussion upon this important subject is invited, which will be open not only to members, but to all physicians present. Dr. Marcy's address will be upon the subject of "Journalism devoted to the Protection and Concentration of Medical and Surgical Science in Special Departments."

J. V. SHOEMAKER, M.D., *Secretary*,
1031 Walnut St., Philadelphia, Pa.

UNIVERSITY OF PENNSYLVANIA—DEPARTMENT OF DENTISTRY.

The annual commencement of the University of Pennsylvania, including the Department of Dentistry (fourth commencement), was held at the American Academy of Music, Philadelphia, on Friday, April 13, 1883.

The annual address was delivered by R. A. F. Penrose, M.D., LL.D. The number of matriculates for the session was seventy-nine.

The degree of D.D.S. was conferred on the following members of the dental class by William Pepper, M.D., provost of the University:

NAME.	RESIDENCE.
Sigurd S. Anderson	Norway.
John F. Austin	Wisconsin.
Charles R. Baker	Iowa.
Oliver W. Barrett	Massachusetts.
Wilton L. Battles	Pennsylvania.
Uriah G. Beck	Pennsylvania.
Colin S. Carter	New York.
Everett M. Cook	Connecticut.
William L. Croll	Pennsylvania.
John F. Davenport	Illinois.
Joseph R. De Witt	Pennsylvania.
De Witt C. Franklin	Kentucky.
J. Warren Harper	Pennsylvania.
Howard J. Herbein	Pennsylvania.
Georg Hofmann	Germany.
David L. James	N. Carolina.
Irving H. Jennings	Pennsylvania.
Edward I. Keffer	Pennsylvania.
Victor Leser	Missouri.
Elmer L. Lewis	Pennsylvania.
John E. Luce	Minnesota.
Albert H. McCandless	Iowa.
John McDougall	Pennsylvania.
John D. Nicol	Illinois.
Joseph W. Noble	Pennsylvania.
J. Abbott Parker	Minnesota.
Robert M. Scott	Pennsylvania.
William H. Sherraden	Iowa.
Frank J. Stowe	Canada.
William D. Taylor	Massachusetts.
Luis F. Tovar	U. S. Colombia.
Antonio G. Valdes	Cuba.
Eugene Wienecke	Germany.
John R. Yorks	Pennsylvania.

UNIVERSITY OF MICHIGAN—COLLEGE OF DENTAL SURGERY.

The eighth annual commencement exercises of the Dental Department of the University of Michigan (College of Dental Surgery) were held in University Hall, Ann Arbor, Mich., on Wednesday, March 28, 1883, at 2 o'clock P.M.

The address to the class was delivered by Dr. G. R. Thomas.

The degree of D.D.S. was conferred on the following members of the graduating class:

NAME.	RESIDENCE.
Frederick Hornby Berry	Michigan.
Charles Blair Blackmarr	Michigan.
Wilbur Buzzell	Michigan.
Maximilian E. Chapalay	Roumania.
Bernard Henry Conlin	Wisconsin.
William Walter Curtis	Illinois.
Walter Irving Dadmun	Wisconsin.
Marshall Bidwell Dennis	Ont., Canada.
William Otis De Puy	Michigan.
George Lewis Fox	New York.
John William Gale	New York.
Charles A. Gallagher	Indiana.
Arthur St. Clair Graham	Ohio.
Will Harmon Hall	Ohio.
Stanley Read Holden	New York.
Frank Alex. McAuley	Michigan.
Charles C. Newcastle	Michigan.
William F. Overholser	Indiana.
Byron Smith Palmer	Michigan.
Lyman T. Phillips	Illinois.
Perley Andrews Powers	N. Hampshire.
Ozora P. Sutherland	Wisconsin.
John B. Van Fossen	Michigan.

EDITORIAL.

THE LATE DR. MARSHALL H. WEBB.

"A SUGGESTION.—From reading the Eulogy on the late Dr. Marshall H. Webb, in the February number of the DENTAL COSMOS, I am sorry to learn that he has left a widow and three children unprovided for, and that this is owing to the fact that he neglected his office practice, in order to teach others the art of filling teeth.

As the late Dr. Webb used the electric mallet exclusively, and spent his time in instructing others how to use it, and as all the patents on said electric mallet belong to The S. S. White Manufacturing Co., and they receive all the profits on the same; and furthermore, as they are about to publish a work by the late Dr. Webb, written on his death bed, would it not be well for the said S. S. White Manufacturing Co. to give his widow and children all the profits from the sale of said work, and also a share of the electric mallet profits, instead of the *cheap* offer of Editor J. W. White to become the treasurer of such sums as the profession may subscribe in their behalf? Empty eulogies will not fill the stomachs of the fatherless and the widow:

> 'Yes—such was the man, and so wretched his fate;
> And thus, sooner or later, shall all have to grieve
> Who waste their morn's dew in the beams of the Great,
> And expect 'twill return to refresh them at eve.
>
> 'In the woods of the North, there are insects that prey
> On the brain of the elk till his very last sigh.
> Oh, Genius! thy patrons, more cruel than they,
> First feed on thy brains, and then leave thee to die.'—MOORE.

"Rich corporations are said to have no souls. Let us hope The S. S. White Manufacturing Co. will be found an exception.—E. OSMOND, M.D., D.D.S."

We give to the above communication, which appeared in the March number of the *Dental Register*, the benefit of the circulation of the DENTAL COSMOS. It is not our custom to notice allusions to the business affairs of the publisher of this journal. In the present instance, however, because other interests are involved, and also because the matter is one in which the profession is concerned, it seems proper that the article copied should not be permitted to work the evil it is calculated, if not designed, to do, without correction.

We do not propose to publish a statement of the business relations of The S. S. White Dental Manufacturing Co. with Dr. Webb. We have abundant evidence that they were thoroughly satisfactory to him, and that he died with the most kindly and grateful feelings toward the Company. During his last illness, at his suggestion and by his request, the Company agreed to publish, at its own risk, his "Notes on Operative Dentistry," for the benefit of his family, and the work is now going through the press.

The intimation that Dr. Webb neglected his practice at the instance of the Company, or in its interests, without remuneration, is without foundation in fact. He never attended a society meeting or a clinic at its request or suggestion. On the other hand, in the belief that a brief change from the routine of his own office and chair would prove a benefit to his health, he more than once proposed an arrangement which he hoped would be mutually advantageous, and named the terms on which he would be glad to illustrate the advantages of the electric mallet while securing needed recreation. As is well

known, the use of the electric mallet was a hobby of Dr. Webb's. He never tired of developing its resources, and was never better satisfied than when he learned some new point which added to its efficiency. He was so convinced of its wonderful adaptation to the needs of the operator that he was solicitous to have it adopted by all who were ambitious to excel as manipulators of gold in filling, and sought every opportunity to demonstrate its advantages.

It is true that the Company owns various patents on the electric mallet, but they have been honestly obtained, by invention or purchase—the sum paid to inventors, however, including Dr. Webb, being in considerable excess of the profits realized from sales of the apparatus.

The project of raising a fund for Dr. Webb's family originated with a few of his personal friends, who voluntarily tendered their contributions and requested the editor of the DENTAL COSMOS, he being readily accessible to the profession, to act as treasurer. It was not, therefore, a "cheap offer" on his part, but a cheerful acceptance of whatever labor might be involved, and at the inevitable risk of stirring up the mud in certain dirty pools.

The basis of the appeal to which reference is made by Dr. Osmond was thus expressed:

> "He gave time and effort without stint to teach all who chose to learn whatever improved methods he had devised, and it is safe to say that all over the country better dentistry is being done to-day in many offices as a result of Dr. Webb's clinics and teaching. A sad side of the case is that, with the feeling that life was before him,—years of labor,—he gave more of his time and strength for the general good than he could afford to; more doubtless than he would have done had he forseen the early termination of his career."

This is less than the truth. Dr. Webb delighted to give to others the benefit of his attainments. It was no unusual thing for him to invite dentists who were interested in his method to accept the hospitality of his home, that they might thus enjoy fuller opportunity of witnessing his operations.

He was constantly in receipt of requests from dental colleges and societies to clinic for them, and acceded to their wishes frequently to his own inconvenience and loss; and he would have indignantly repelled the insinuation that what he was gladly doing for the good of his profession and the benefit of his brethren was from other than the desire and the effort to serve them.

The personal animus of the article which we have copied is apparent, and we are surprised that any respectable journal should have lent its pages to a left-handed attack of the character of the article quoted—a malicious fling at a business house over a dead man's coffin. But beyond the gratification of the spleen of its writer,—a luxury to which he is welcome,—we feared that its

effect would be to lessen interest in the effort to provide a reasonable testimonial for the family of Dr. Webb, and therefore, and only therefore, deemed its impertinence worthy of notice.

For whatever service Dr. Webb rendered to The S. S. White Dental Manufacturing Co. he was remunerated satisfactorily to himself. What service he rendered to the profession as a whole, or to individual members of it, is not for us to determine. The opportunity is open for each to give according to his appreciation and ability. We do not criticise a failure to respond nor the sum subscribed. We suggest, however, that any one who, from whatever cause, prefers not to participate in the effort may find better employment than sneering at those who are seeking to lessen the burden of bereavement.

CHICAGO DENTAL INFIRMARY.

Originally started to provide necessary facilities for the clinical teaching of dental topics to the students of the several medical colleges of Chicago, the Chicago Dental Infirmary has reached its logical development, and now takes its place in the ranks of the dental schools. The founders of this institution, believing that dentistry should be practiced as a specialty of medicine, contend that a necessary qualification of the dental surgeon is a thorough medical education. The first annual announcement, which we have just received, says:

> "It is the plan of the Infirmary to confer the degree of Doctor of Dental Surgery only upon such persons as hold a degree in medicine from such colleges as are recognized by the Illinois State Board of Health."

In this requirement the new school takes a radical departure. While other schools recognize the value of the medical degree by accepting its possession as equivalent to one course of lectures, the Chicago Dental Infirmary stands alone in demanding that its graduates shall have first received the doctorate in medicine. There are in Chicago six medical colleges, all of whose students have the opportunity of instruction in dental surgery as a part of their medical education.

The members of the faculty are well known as practitioners of ability: W. W. Allport, M.D., D.D.S., professor of dental pathology and therapeutics; George H. Cushing, D.D.S., professor of principles and practice of dental surgery; L. P. Haskell, professor of prosthetic dentistry and oral deformities. Intending students of dentistry have thus placed before them this special feature in dental education and can estimate the relative advantages of the plan. We wish this and every other effort to advance the status of the profession all the success it merits.

BIBLIOGRAPHICAL.

WOOD'S HOUSEHOLD PRACTICE OF MEDICINE, HYGIENE, AND SURGERY. A Practical Treatise for the use of Families, Travelers, Seamen, Miners, and others. Edited by FREDERICK A. CASTLE, M.D. In two volumes, imperial 8vo., pp. xvi., 819; xiii., 942. Illustrated by over seven hundred fine wood engravings. New York: William Wood & Co., 1880. Price, in extra muslin, $5.00; in full red leather, $6.00; in half Turkey, $7.50, per volume.

The scheme of the work represented in these two ponderous imperial octavos is to place within the reach of the lay reader a concise, comprehensive, and intelligible description of the human body, its anatomy, and physiology; a classification of local and general diseases, symptoms, significance, and methods of diagnosis, with judicious advice, designed in part to meet the wants of those who cannot command professional assistance in an emergency, but also to help those more fortunately situated to co-operate intelligently with a physician, to qualify for proper nursing in medical and surgical diseases, and to give such knowledge of hygiene, food, air, ventilation, drainage, clothing, exercise, etc., as will enable the reader to lead a rational life and avoid preventable sickness. In a word, it is intended to be a complete medical encyclopedia for the family. It is unquestionably the most elaborate, the most judicious, as well as the most scientific publication of its kind which has yet appeared; and although there are many and valid objections against that class of books designed to make every man his own doctor, the work before us is not intended nor likely to be so used, while it certainly will be very useful in preventing quackery by supplying scientific knowledge. As a book of reference in the family and an educator of the young; as an aid in pointing out how to prevent disease, it gives much important information, and in such an intelligible form, on matters in which every individual has such a vital and daily interest, that it may be safely and heartily commended to the non-professional reader.

In the preparation of this elaborate work the excellent plan was adopted of assigning the various topics to physicians eminent as authorities in their particular lines of practice. The list of contributors, numbering about forty, includes representative writers and practitioners from all sections of the United States, among whom may be mentioned Drs. Richard J. Dunglison, J. Solis Cohen, Henry Hartshorne, Edward L. Keyes, Benjamin Lee, Alfred L. Loomis, Theophilus Parvin, William H. Van Buren, Mary Putnam-

Jacoby, and Frank Abbott, who contributes the section on the mouth and teeth.

The illustrations form a prominent feature of the work; many of them are entirely original, and all were made expressly for this publication. A special merit in this connection is that, although treating of many delicate subjects, there is not an illustration in these volumes which need prevent their being placed before any member of the family.

In the space permissible for such a notice, it is impossible to give even a summary of the contents of these elegant volumes, but the whole field of medical and surgical science, so far as it could be of value to the non-professional reader, has been very thoroughly covered. The editorial supervision appears to have been intelligently exercised, and the paper and typography are all that could be desired.

Dental Vade Mecum. Concise Notes on Anatomy, Physiology, Surgery, and Chemistry. By James Hardie, Dental Surgeon. Fourth edition. Glasgow: William Collins, Sons & Co., 1882.

The author explains that his object in compiling this little book of sixty-seven pages was to facilitate the labors of the dental student by placing before him concise information on the various subjects embraced in its title. He says, these "Notes are not to be looked on as *entirely* (Italics ours) to take the place of the ordinary text-books, but simply as an assistant." To show how "concise" is the information conveyed, two pages and seven lines having been appropriated to the topic of "Restoring Decayed Teeth," one-third of the limited allowance for the discussion of this important subject is given to the following instructive histories:

"While managing a practice in Devonshire, an old gentleman (aged eighty-one years) called upon me one day to see if it was possible to stop two of his front teeth, which were decayed. I filled the cavities with a white mineral stopping, and he was highly pleased. He told me that many years previously he discovered that one of his molar teeth was decayed. He cleaned out the cavity as well as he could, went down to the seashore and selected a small pebble which fitted tightly, he bit it firmly into the cavity, where it remained for several years. This is the most original method of stopping teeth, I think, of which I ever heard."

"A wag once called on the dentist and asked him if he could extract stumps. He naturally answered in the affirmative, on which the wag produced the head of an old rake, the teeth of which were broken. Undismayed, the dentist took the rake and successfully accomplished the operation, and turned the tables on the wag by charging him a guinea each."

Of the five and a half pages devoted to "Artificial Teeth," a considerable portion of the space is taken up with personal reminiscences, of which the following are specimens:

"While in Paris I had an excellent opportunity of observing American customs,

as it is a favorite resort for our American cousins. I remember one day while attending to an American, that instead of spitting into the spittoon which I was holding under his nose, he deliberately spat over it several times, about a yard or two, on the carpet."

"What amused me most, however, was a little French stationer, for whom I made a set of teeth. He was something like the lady who wore half a dozen gold watches to show how wealthy she was. If he had not the watches, he had an immense bunch of gold chains; and as for rings, he had something like half a dozen or more on each finger, thumbs not excepted. He also wore long Hessian boots, with a wide rim of scarlet leather round the tops."

"I also made a set for a French huntsman who had not sounded the horn of chase for many years from the want of his front teeth. The patron told me in English to be sure and make it very firm, as he had to play on the *cornucopea.* The set was a success, as he brought the horn next day and nearly brought the house down."

THE STUDENT'S GUIDE TO DENTAL ANATOMY AND SURGERY. By HENRY SEWILL, M.R.C.S., etc., etc. 16mo. pp. 222. London: J. & A. Churchill, 1883.

The first edition of this book was noticed at some length in these pages on its appearance in 1876. The author has revised and amplified the matter, and made some valuable additions. It is in many respects an admirable condensation, and most of the topics are as well treated as the space allotted to them would permit; but such a limitation compelled an altogether too elementary presentation of subjects deserving fuller consideration. We notice with regret that the author still commends the use of arsenious acid for diminishing the sensitiveness of dentine; still considers the perchloride of iron the best local styptic for hemorrhage following extraction. Except a few more instances of this kind of teaching, which we consider unsound, our chief objection to the volume is that there is not enough of it.

THE TEETH: HOW TO PRESERVE THEM AND PREVENT THEIR DECAY. A Popular Treatise on the Diseases and Care of the Teeth. By S. H. LINN, M.D., D.D.S. London: Charles Griffin & Co.

With reference to this book we will simply quote the criticism made long ago of a certain production: "There are some good things in it, and some new things; but the good things are not new, and the new things are not good." The most noticeable feature, however, is the lack of quotation marks where they should properly be placed.

UEBER DAS STUDIUM DER ZAHNHEILKUNDE IN ENGLAND. VON DR. ALFRED STERNFELD. München, 1883.

The above title indicates the subject-matter of a pamphlet of forty-four pages descriptive of the methods of study and practice in the den-

tal departments of the hospitals of England. The author's account is based mainly on personal experience and observation in London.

He enters minutely into a description of the arrangements of the dental department, which in the main are similar to our own. They separate the extraction-room proper from the anesthetic-room. The latter is furnished not only with the necessary appliances for the administration of nitrous oxide, etc., but also with means for restoration in case of accidents. The operating-room has eighteen chairs, and is lighted by skylights, a plan that should be adopted wherever practicable. The library is well supplied with books, and the museum possesses over 2000 specimens, covering all the subjects taught. The report from the various hospitals for the year 1881 shows the very large number of 30,799 patients treated, of which more than half were extractions, 18,311; 4000 teeth were removed under nitrous oxide; 1461 gold, 100 tin, and 4710 plastic fillings were inserted, and 886 irregularity cases treated.

The author then enters into a detailed description of the studies and work, which, while doubtless of value to his German readers, is too much allied to our own to be either instructive or interesting.—T.

A Manual of Chemical Analysis as Applied to the Examination of Medical Chemicals. By Frederick Hoffmann, A.M., Ph.D., and Frederick B. Power, Ph.D. Philadelphia: Henry C. Lea's Son & Co., 1883.

This is the third edition of an already well-known work, which is intended to supply to druggists, manufacturing chemists, and pharmacists, and to dispensing practitioners of medicine, a guide in the examination of the identity, quality, and purity of the medicinal chemicals of commerce. It has been most carefully revised and enlarged; has been made to conform with the recent edition of the American and German Pharmacopeias, and constitutes in its present shape one of the most comprehensive and reliable treatises upon the subject, which is assuming increasing importance as the wide-spread adulterations and dilutions of drugs are being discovered.

Pamphlets Received.

Physiology of Protoplasmic Motion. By Th. W. Engelmann, M.D., Professor of Physiology in the University of Utrecht. Translated by Charles S. Dolley, M.D. Rochester, N. Y.: Davis & Leyden. Price, 50 cents.

Proposed Ordinance for Regulating Plumbing, House Drainage, etc., in the City of Philadelphia. Philadelphia: P. Blakiston, Son & Co., 1883. Price, 10 cents.

TRICHINÆ: Their Microscopy, Development, Death, and the Diagnosis and Treatment of Trichinosis. By W. C. W. GLAZIER, M.D. Illustrated with 17 wood-cuts. Published by the "Illustrated Medical Journal Co.," Detroit, Mich. Price, 25 cents.

PERISCOPE.

THE RACHITIC DIATHESIS.—Rachitis or rickets is a disease of the general nutritive process, attended with structural changes most conspicuous in the bones; this consists in an abnormal increase in the cartilaginous and embryonic substance of the osseous tissue. * * * It has been a question much discussed whether or not this condition is an unmistakable or invariable evidence of congenital syphilis, as some authorities claim, but I think that our experience warrants the statement that inherited syphilis, being also a disease of the general nutritive process, can by simply retarding development be in itself a cause of this form of rickets, and that independent of it, the rickety diathesis alone, when acquired in utero will act as an equally potent cause. I might even go further and state that the tubercular and scrofulous diathesis of ante-natal acquisition would give us the same result.

I have seen babes born of syphilitic mothers with *craniotabes* and I have also seen *craniotabes* in new-born children where no specific history could be found. A marked example of this occurred during my term in this hospital two years ago; one of a pair of colored twins died shortly after birth, of convulsions, and its skull presented the picture that I have just drawn for you. The other child lived and gave us an example of marked rickets, and if my memory serves me right, died of catarrhal pneumonia, a frequent complication of the rickety thorax. As to the *cause* of rickets, independent of hereditary predisposition, the following present themselves as powerful determining influences; insufficient or improper food, faulty assimilation, residence in dark, damp, ill-ventilated places, exhausting diseases; all of these play their part, with the addition of that ever-important state, the "what-is-it" of etiology,—a tendency to the production of disease.

Various theories have been promulgated as to the production of rickets: one a deficiency of phosphates in the blood; the other an excess of acids, mainly lactic, which dissolve the phosphates, and thus allow them to be eliminated by the kidneys, instead of being deposited as alkaline lime-salts in the bones; in other words, the osseous metamorphosis does not occur, the diploë of the flat bones enlarge, and the laminæ separate more or less from each other, forming interlamellæ, which finally fill up with gelatiniform fluid. * * * The teeth of rickety children are retarded: in practice, if the child does not present a tooth at twelve months, we generally regard it as pointing to a rickety diathesis; you will also usually find the fontanelles patent, especially the anterior, which will remain so until the twentieth month, or even later. There is liability to perspiration about the neck and head—Jenner tells us that this is diagnostic of

the disease; the urine is increased in amount; the bowels are variable, alternating between a condition of constipation and one of diarrhea; hyperesthesia is sometimes a marked symptom. The lungs may be attacked by pneumonic, catarrhal, or tubercular phthisis; the brain may be œdematous, or its ventricles may be filled with serum.

The bronchial and mesenteric glands are enlarged; the intestinal glands are also involved in the general dyscrasia; hence, we have as a prominent symptom, disordered nutrition, together with the consequent emaciation, wasting of the muscles, and loss of color.

The osteomalacia or malacosteon affecting women after child-birth, of which we see a number of examples in this house, bears a close relationship to the rickets of children; but the former is confined to adult life, while the latter is a disease peculiar to children. Malacosteon is also attended with severe pains.

Parents are always solicitous as to the *prognosis* of rickets. The result is the same as I have told you in all the diathetic diseases: if the inherited taint is not too overwhelming, our little patients will eventually practically recover, although the deformities of the disease still remain. This is especially so when the disease commences about the second year or later, and only affects two or three bones.

You must pay due regard to the condition of the gastro-intestinal tract as an important factor in making up your prognosis.

Unfortunately, in the major portion of your cases, you will not find the disease pursuing so favorable a course, and the little sufferer will perish either from exhaustion, bronchial or intestinal catarrh, or occasionally by an exanthemata as a complication.

In the *treatment* of these cases, your first thought should be as to their hygienic condition and surroundings; and see to it that these are as perfect as circumstances will permit.

Food next calls our attention. If the child is still nursing, experience will tell you that there is no food so well adapted to its use as the maternal milk, provided, of course, that the supply is sufficient and of proper quality, and that the mother is not a victim of any of the four diatheses about which I have told you so much during our visits to the wards. As the child grows older, its diet must still be uppermost in your plan of treatment.

We have no medicinal agent which acts as a specific in this disease (as you know iodine and mercury do in the syphilitic diatheses), but we must exhibit our drugs in order to meet special indications. Lime-water meets the condition of the gastro-intestinal tract, and also supplies the bones with the needed material. A good plan is to give it with the milk. Cod-liver oil should be our sheet anchor to prevent emaciation. Give it either internally or by inunctions; the latter method you will find acts marvelously in these cases.

Iron, as the tinct. of the chloride, must also be supplied as an hematic, and for its restraining property on the bowels.

Salt sea-baths, among the rich, are good adjuvants to your general treatment.—*John M. Keating, M.D., Philadelphia Hospital Clinical Conference, Med. and Surg. Reporter.*

Syphilis and Rachitism.—At a recent séance of the *Soc. de Chirurgie*, M. Parrot, at the request of M. Verneuil, laid before the

society the results of his researches on the near connection binding together these two morbid conditions. Rachitism is the product of syphilis; but syphilis, before arriving at the period when the lesions of rachitism are found, has passed through many intermediary stages, or phases of transition. To determine the syphilitic origin of rachitic lesions is a very difficult matter; it is very rarely that any information can be demanded on so delicate a subject from the parents, and the criterion of diagnosis must be sought for in the traces of syphilitic disease found in the children themselves.

These signs may be ranged under several categories. First come the syphilides found on the skin of the buttocks, thighs, etc. Secondly, various lesions of the viscera are found at the autopsy. A third means of diagnosis, according to M. Parrot, exists in a species of desquamative syphilide of the tongue. Finally, syphilis has a special action on the teeth in these children, inducing special lesions of the teeth during both primary and second dentition.

The varieties of these alterations are numerous, the capsular alteration (alteration en capsule) found on the anterior and posterior surface of the incisors; the transversal grooving and the cuspidian alteration of the molars; in another form the teeth are eroded at their bases. All these lesions are systematic, and are found in the same order; they may persist during the entire period of life, and are under the dependence of inherited syphilis.

Passing to a complete and thorough examination of the visceral lesions and those affecting the bones, M. Parrot gives a description of the bone-lesions, which are always identical, polymorphous, and finally constitute the rachitic condition.

They may be found during the last months of the intra-uterine period, and up to the period of second dentition. Three principal types are observed:

The first is constituted by osteophytes; the bones are deformed, and the extremities and diaphyses, though intact, are surrounded by hard and friable masses. The tibia and humerus are principally affected.

The second condition is constituted by a species of gelatiniform atrophy. The diaphysis is often found fractured, and there frequently exists what M. Parrot terms a "syphilitic pseudo-paralysis."

The third type is characterized by the appearance of spongoid tissue, or classic rachitism, the extremities of the long bones are affected, and bending and fractures of the bones are found.

These syphilitic lesions have a very near connection with those found daily at the autopsy of rachitic subjects, and it is impossible, in the presence of such evidence, not to conclude that the causes which induced the first alterations also produced those found in the last period. Authors who have studied rachitis have invoked the most diverse causes to explain its origin.

But these causes, alcoholism of parents, premature or imperfect nursing at breast, enteritis, bad hygienic conditions, etc., are not sufficient of themselves to produce rickets. The presence of a morbid germ, a constitutional defect, which finds in these special causes and the state of debility they induce a soil proper for its development, is necessary for the proper evolution of the rachitic disease. This germ, this constitutional defect, is congenital or hereditary syphilis.—*Medical and Surgical Reporter.*

THE FUNCTION OF SECRETION.—An interesting sketch of the gradual discovery of the true functions of glands was given by Professor Gamgee at the last meeting of the British Medical Association. He stated that the discoveries of Carl Ludwig finally refuted the "percolation" theory of secretion. In 1851 he announced the fact that the secretion of the salivary glands is under the influence of the nervous system, and by experiments performed in conjunction with his pupil Rahn, demonstrated that secretion occurs on direct stimulation of glandular nerves, even when the circulation has been arrested for a time. Ludwig's monometric experiments still further demonstrated the independence of salivary secretion with regard to arterial pressure. In his first recorded experiment the mean pressure of blood in the carotid artery amounted to 108.5 millimeters of mercury; while during stimulation of the nerve-filaments going to the submaxillary gland the pressure in the monometer inserted in Wharton's duct rose to between 190.7 and 196.5 millimeters. Again, in 1857, Ludwig with his pupil Spiess, proved that heat is evolved during the process of secretion, the saliva from the submaxillary gland being sometimes as much as 1.5 Cent. higher in temperature than the blood going to the gland, a fact for which percolation could not in any way account. Continued investigation of the innervation of the salivary glands by Bernard and Eckhardt, led to the discovery that these glands receive their nerve-supply by two channels, stimulation of each of which produces very different results. Thus, in the case of the submaxillary gland, stimulation of the chorda-tympani nerve causes dilatation of the blood-vessels, and greatly increased blood supply in the gland, accompanied by an abundant watery secretion; while stimulation of the sympathetic nerve induces constriction of the blood-vessels, and a scanty, extremely viscid secretion. Any revival of the "percolation" theory which these facts would seem to favor was prevented by Kenchel's discovery, that atropia distinguishes two sets of fibers in the chorda-tympani nerve—one controlling the blood-supply of the gland, and not affected by this alkaloid, the other controlling the secreting cells, and paralyzed by the alkaloid, so that stimulation of the chorda tympani nerve after injection of atropia results in greatly increased vascularity of the gland without any secretion—an additional proof of the independence of secretion with regard to blood-pressure.

Direct continuity of nerve-fibers with the secreting cells, though probably existing in all glands, has, as yet, been only indisputably demonstrated in the esophageal glands of the blatta orientalis, or common cockroach by Kupffer. Although normally these secreting cells are controlled by nervous influences, the so-called "paralytic" secretion of the submaxillary gland observed by Bernard after section of all the nerves going to the gland, would seem to indicate that the nerve-control only brings the action of the cells into harmony with the requirements of the body, and is not the cause of that action.

These morphological units, the secreting cells, have been shown by Klein to possess a complex structure of an intra-cellular and intra-nuclear net-work, the meshes of which are filled with protoplasm and the other constituents of the cell-body. Again, Heidenhain, Langley, and others, have discovered that these cells exhibit

differences corresponding to varied states of functional activity. Thus, during "rest," the cell would seem to be converting its protoplasm into paraplasm, while during "action" the paraplasm is changed into the specific constituent of the secretion and discharged, while the remaining protoplasm grows again by appropriating and assimilating materials from the lymph, which is at this time poured forth more abundantly from the increased blood-supply. In no case does mere mechanical percolation occur. Even in the glomeruli of the kidney, where Bowman, Ludwig, and others thought that water was mechanically filtered off, Heidenhain has shown that the delicate epithelial cells which cover the vessels of the glomeruli are probably the agents in the process.

Secretion is, then, the result of the action of those epithelial cells whose function was not long ago so little known that it was suggested that they might possibly form a sort of holiday garb for the gland in its unemployed state. Each cell is, as it were, an independent organism, dependent for its nutrition on due blood-supply, appropriating material from its immediate surroundings, and thus affecting its less immediate surroundings, assimilating this material, and so being capable of growth, development, and maintenance—in its action—evolving heat and CO_2, and transforming energy, but having its action regulated and harmonized to the needs of the whole system by nervous control.—*Quarterly Compendium of Med. Sci.*

Dental Caries.—Mr. Henry Sewill opened a discussion on the question: "Do the incontrovertible facts which we now possess as to its etiology and pathology fully account for the phenomena of dental caries?" He thought there could be no doubt that this question should be answered affirmatively. He thought it had been satisfactorily proved that caries was essentially a disintegration of tissue, due to the action of external causes. The fact that caries occurred in dead teeth and in artificial teeth made of ivory, was of itself sufficient to show that the disease was not of constitutional or even of local inflammatory origin. The chief agent in this disintegration was certainly acid derived from the decomposition of food, from deranged secretions, acid mucus, etc. The predisposing causes were whatever rendered the enamel and dentine more easily acted upon by acids, as fissures and malformations of the enamel, soft, badly formed dentine, crowding and irregularity of the teeth, which favored the lodgment of decomposing *débris*, and interfered with proper cleanliness; and anything which favored the formation of acid within the mouth, as a bad state of the secretions, chronic dyspepsia, etc. Mr. Sewill then reviewed the authorities on the subject, showing that Tomes, Wedl, Leber and Rottenstein, Magitôt, and others, were all of opinion that caries was the result of ordinary physical causes acting from without. Mr. Coleman replied that, if acid was the sole cause of caries, the result would be a more general action upon the teeth than was commonly met with. He had tested the state of the mouth in some hundreds of cases of acute caries, but could not detect any unusual acidity. The statement that caries in living and in dead teeth was identical, had been denied by some observers. Dr. Frank Abbott asserted that he had found distinct evidence of inflammatory change in carious dentine, and it appeared

to be a fact that the changes found in carious cementum were identical with those found in bone during the progress of undoubted inflammation. He thought, also, that the appearance of caries in previously sound teeth, which not infrequently occurred after severe illness, pointed to the influence of a constitutional, and not merely a local cause.—*Reports Odontological Society of Great Britain, in Brit. Med. Jour.*

Causes of Dental Decay.—Dr. Carpenter first traced the history of dental caries, so far as it could be gathered from early writers and from a careful examination of ancient burial-places, showing that, although never so generally prevalent as it is now, caries was not a new disease, and that the evidence thus obtained went to prove that luxury, indolence, and vice tended very much to promote the development of this disease. He then went on to discuss some of its predisposing causes. There could be no doubt as to the effects of inherited tendencies, such as the syphilitic and gouty, or of others of a less distinctly-marked character, which showed themselves in the form of defective nerve-power, or of inefficient nutritive force. These, then, were the consequences of accidental injury to the fetus or young child, to wear and tear of the organ itself, to improper diet, and other causes, which might be conjoined with the hereditary tendency, and produce still more serious results. Most of these causes acted chiefly in early life, but improper diet was not an uncommon cause of disease of the teeth in later life. The most marked example of this was seen in the loss of the teeth from scurvy, but less striking cases were frequently met with in which loss of these organs was caused by gouty inflammation of the peridental membrane, brought on by indulgence in a too highly albumenized diet. Dr. Carpenter then discussed in turn the effects produced on the teeth by hereditary tubercular, syphilitic, strumous, and gouty taint. The bad results of the first seemed to be due to imperfections of growth, certain groups of cells undergoing fatty degeneration instead of the normal calcification, producing structurally weak dentine, in which caries made rapid inroads unless promptly checked by proper treatment. Syphilis and struma produced marked effects upon the teeth, as they did upon other parts of the cutaneous system. The effects of the gouty diathesis were not so distinct, which might be due to the fact that the disease was not usually fully acquired until an age at which procreation had ceased. Of the effects of the rheumatic diathesis upon the teeth little was yet known. In conclusion, he called upon the dental profession not to be satisfied with improving their methods of treatment, but to look forward to the time when the prevention of disease would be considered by the dental surgeon of greater importance than its radical cure.—*Reports Odontological Society of Great Britain, in Med. Press.*

The Causes of Dental Decay.—The discussion of Dr. Carpenter's paper (read at the previous meeting) on this subject was begun by Mr. Oakley Coles, who said that Dr. Carpenter's statement that so-called "dead teeth" were more liable to decay than others, did not agree with the ordinary experience of the dental profession; nor would his assertion that the subjects of inherited gout were

very liable to caries; such people generally had large, strong teeth, which were but little liable to caries, but which were liable to be cast off by recision of the gums, or as the result of chronic congestion of the alveolo-dental membrane. Dr. Carpenter apparently had not observed any connection between rheumatism and caries, but it was well known by members of the dental profession that acute rheumatism was liable to be followed by the worst form of decay—that known as "soft caries."

Mr. Henry Sewill said it seemed to be implied in the paper that the causes of dental decay were doubtful or unknown; but, as a matter of fact, there was no mystery about them. The predisposing causes were such as led to structural defects in the teeth; there was no doubt that syphilis was a cause of defective teeth, but he was strongly of opinion that gout had no predisposing influence whatever. There could be no doubt that caries itself was wholly due to the action on the teeth of the acid products of decomposition formed in the mouth, which permeated the porous enamel and acted on the dentine. It had also been lately shown that the progress of the disease was assisted by the proliferation of micro-organisms in the canals of the dentine, these organisms having themselves the power of producing an acid secretion. It was not in any sense a constitutional, but a purely local disease.

The discussion was continued by Mr. Redman, who suggested that Dr. Carpenter had omitted to mention one predisposing cause of caries, viz., the use of carefully cooked and soft food, it being a well-known law in physiology that any organ not fully used would deteriorate; and by Mr. Henry, who asked whether it really was an established fact that dental caries had become more prevalent? No doubt it came under observation more; but might not this be due to the fact that more attention was now paid to the preservation of the teeth?

Mr. Coleman and Dr. Walker both gave it as their opinion that the increase of caries was an undoubted fact. The latter dissented from Dr. Carpenter's statement that gout was a cause of caries. He thought that improper food in infancy was one common cause of defective teeth, and agreed with Mr. Redman that their comparative disuse in mastication was another.

Mr. Hutchinson also thought that the artificial life led by mothers, and the injudicious feeding of infants, were two of the chief causes of the prevalence of bad teeth.

Dr. Carpenter then replied at some length, saying that his statements—particularly with regard to gout—were founded on careful personal observations made in the course of forty years' experience of medical practice. He admitted that rheumatism exerted an influence on the teeth, but thought that this part of the subject required carefully working out. He quite agreed that the improper feeding of children was a very common cause of bad teeth, but could not admit that the etiology and pathology of dental diseases were as yet quite as satisfactorily explained as Mr. Sewill claimed that they were.—*Transactions Odontological Society of Great Britain, in Medical Press.*

IRREGULARITIES OF THE DENTAL ARCH.—Dr. Harrison Allen called attention to the irregularity of the front and lateral curves forming

the dental arch, and to some points in connection with the hard palate. He defined the curve of the teeth placed in the front of the jaw and answering to the premaxillæ, and those placed at the sides, the latter, pertaining to the maxillæ, having been found by him to be in the jaws of civilized whites always asymmetrical.

The folds (rugæ) of the hard palate are subject to much variation. In the human fetus of five centimeters in length, they are regular, six in number, and arranged across the palate as in certain of the lower animals. At birth they have already become irregular, but as to how far such irregularity might exist without indicating deformity, he believed no data had been collected. The names canine, first intermediate, first bicuspid, second intermediate, second bicuspid, etc., were proposed for these rugæ. They are further arranged not infrequently in a median and a lateral set, an arrangement which is strikingly exhibited in some quadrumana. When this arrangement appears in the human subject it may be accepted as an instance of reversion.

It was thought that a study of these rugæ, since they have systemic value in cheiroptera, insectivora, and quadrumana, might be undertaken in connection with other anthropological data. A series of plaster impressions of the dental arches and rugæ of young and adult heads of different races would be of interest in this connection.

The disposition of the form of the wisdom-tooth to occasionally simulate the form of the premolar was commented upon.—*Proceedings of the Academy of Natural Sciences.*

Alkaloids in Human Saliva.—During recent years the influence of saliva in the domain of experimental pathology has been one of considerable prominence. We need only refer to the researches of Pasteur and other French observers to confirm the truth of this. In 1881 Gautier believed he had discovered some chemical bodies resembling alkaloids in the healthy human saliva. These bodies, when injected into the tissues of animal organisms, produce effects, best seen in birds, like those caused by the venom of serpents. Odo Bujwid has attempted to verify and extend the observations of Gautier, but without success. He does not directly dispute the presence of the alkaloids, but inoculations performed on pigeons, moles, and frogs, have been productive of singularly negative results.—*The Lancet.*

Modification of Salivary Secretion by Excitation of the Sigmoid Gyrus.—M. Bochefontaine has observed that violent excitation of certain regions of the cerebral cortex is followed by a condition of complete inexcitability. The passage then of a galvanic current through a point of the sigmoid gyrus, whose stimulation was previously followed by a secretion of saliva, is then inefficacious; but this same current when passed through a point in the immediate neighborhood, then causes a flow of saliva and this point in its turn becomes inexcitable. M. Bochefontaine proposes the following explanation: denying the excitability of the gray matter, he attributes the phenomena to stimulation of the white peduncular fibers; when these fibers are excessively stimulated at any point of their path,

they become inert through a small extent, but preserve their excitability through the remainder of their path.—*Le Progrès Médicale.*

The Functions of the Soft Palate and Uvula.—In the *Amer. Jour. of Med. Sciences* for April, 1882, Dr. Whitfield Ward publishes a paper, in which he shows that the velum and uvula play an important part in the production of nearly every tone that issues from the vocal organs, and, without their proper action, singing is out of the question. During the production of tones that are emitted through the nose alone, the free border of the velum rests upon the dorsum of the tongue, thus shutting off all communication between the fauces and anterior buccal cavity, and increasing the length of the human musical pipe. If, during the intonation of certain notes, the pendulous velum should be pressed up against the pharynx, exactly the same effect would be produced as though a piece of the upper extremity of an organ pipe were to be cut off; namely, the placing of the note higher in the scale. The physiology of the uvula is none the less remarkable, since very many of the actions of the velum are entirely under the control of this important little body, which acts as its supporter.—*Cincinnati Lancet and Clinic.*

Operation for Salivary Fistula.—At a meeting of the Cincinnati Academy of Medicine, Dr. J. L. Crouse reported a case of salivary fistula, stating that it was of interest on account of the operation employed being different from that usually mentioned in text-books, and on account of its favorable result.

The patient, a girl of five years, four months ago injured herself by falling upon a sharp piece of wood, which entered her cheek. The greater part of the foreign body was removed at the time of injury, but subsequently several smaller pieces came away. The wound discharged all the time, and not seeming to get any better, the mother brought the patient to the clinic of the Medical College of Ohio. Here the speaker saw the patient for the first time. She presented, on the left cheek, midway between the angle of the mouth and the concha of the ear, a linear cicatrix, vertical in direction, of one and one-half inches in length. At the upper border of the same there was a large vesicle filled with turbid fluid. This the mother said would burst every now and then, discharging the watery contents over the cheek. As long as there was a free outlet to the secretions, the patient complained of no disagreeable symptoms; but when the opening closed, then pain as well as swelling of the parotid region supervened.

On August 4, three months after the receipt of injury, he operated by passing a silver wire, armed with two straight needles, through the external opening into the buccal cavity. The free ends of the wire were then twisted in the mouth and the external wound closed.

The object of the wire was to maintain an opening between the injured duct and the buccal cavity. It was allowed to remain there until the external wound had closed.

On September 5, thirty-two days after the operation, the wire was removed. The recovery was perfect. The last time the patient was seen was on October 24, seven weeks after removal of wire. At that time the wound was still closed.—*Cincinnati Lancet and Clinic.*

Toothache—Iodoform.—Schaff recommends iodoform on account of its gently caustic action as an anodyne application to exposed tooth-nerves. The circumstance that a single or repeated application of iodoform does not produce any irritation, much less any inflammation of the periosteum, and the double function of the remedy as a cleansing and disinfecting agent, make it especially appropriate as a caustic, particularly before the introduction of a temporary filling. The author uses a paste consisting of iodoform powder, 60 grs.; kaolin, 60 grs.; carbolic acid, 8 grs.; glycerin, q. s.; oil of peppermint, 10 gtt. Triturate the iodoform, kaolin, and oil of peppermint, with enough glycerin to form a thick paste.—*Practitioner.*

Premature Dentition.—A few days since, while making a friendly visit to a patient I attended in confinement five weeks ago, I asked her how her baby was doing. She remarked, "Very well, indeed; it has two teeth." Upon examination of the mouth I found the two lower central incisors perfect and well formed. The mother stated that she first noticed the teeth on the ninth day after her confinement. As she did not have occasion to examine the child's mouth before that time, it may have been born with the teeth; at any rate, the teeth were there when it was nine days old.

The child is a female, well developed, of medium size, and apparently in good health.

Cases in which there have been teeth at birth are very rare. J. Lewis Smith speaks of having met with one or two such instances.

I have frequently observed the size of the fontanelles in these cases of abnormal dentition. In this instance, both fontanelles were well closed.

In a case of retarded dentition seen by me some time ago, (the patient, a boy, twenty-six months of age,) the two upper and two lower central incisors only had appeared, and both fontanelles were as large as they usually are at birth. The boy was of a nervous temperament, ordinary size, and not of scrofulous disposition. I attended this boy during several attacks of sympathetic convulsions, which attacks, the mother informed me, he has had three or four times during the past six months. The gums were in a normal condition, and the convulsions did not seem to be caused by the delayed dentition.

What relationship there can be between dentition and the state of the fontanelles, I cannot see, unless by some means or other it be a too rapid or too slow formation of phosphatic matter in the system. —*D. A. Hengst, M.D., in Medical and Surgical Reporter.*

Syphilitic Ozena, Ulcers of the Mouth, Nose, etc.—Iodoform. I consider iodoform the most valuable addition to the treatment of venereal diseases that we have had for many years. I have found it very useful in the later manifestations of syphilis, such as ozena, ulcers of the mouth, nose, etc. For these cases I use it as a fine powder dusted on, or suspended in vaselin or glycerin, in the proportion of from gr. x to ʒj in the ounce. I have used the drug very freely, and have never seen any bad effects; but as the application has almost almost always been to suppurating, and, therefore, non-absorbing surfaces, effects upon the system are not likely to have occurred.—*M. A. G. Miller, Edinburgh Med. Journal.*

Mercurial Salivation.—Dr. Panas, of the Hôtel Dieu, insists that mercurial stomatitis is no indication of the system's saturation with mercury (*Gaz. des Hôp.*). It is a complication which greatly impedes treatment, and depends upon an anterior alveolo-gingival stomatitis, and may be always prevented by curing in advance, by local means, the condition of the gums and alveoli. This is done by the removal of the tartar, and then the application of tincture of iodine and carbolic acid diluted to a twentieth; these, to be of use, being introduced to the bottom of the alveoli. If the gums are quite healthy, astringents applied daily will keep them sound and healthy, however long the mercurial treatment. Dr. Panas considers chlorate of potash inefficacious and even capable of doing harm by its irritation.—*Louisville Med. News.*

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

A Lady patient of mine has been wearing an upper denture on black rubber, which, by reason of the absorption of the alveolus, has become so loose that it is with difficulty she can retain it in her mouth. When first inserted it fitted well. The absorption is principally of the arch in front, between the first bicuspids, leaving the mucous membrane loose and gristly, rolling on the deeper tissues and shifting position with every attempt to take an impression. The absorptive process started about one year after the extraction of the teeth, and is still continuing. What is the cause and what will arrest it?—H. R.

Let C. S. W. B. (March number of the Dental Cosmos, "Hints and Queries") stop experimenting on that sick tooth and proceed heroically as follows: Extract; remove all tartar or diseased membrane adhering to the root, and fill the pulp-chamber and nerve-canal with Agate cement, completing it at the apex with cohesive gold; cut a lozenge-shaped piece of platinum, bend it over the cutting-edge of the tooth, and burnish it so as to form a snugly-fitting stirrup, with the sharp points extending two-thirds of the way up the labial and lingual aspect of the crown. Cleanse the root-socket of all blood-clot, and mop it out thoroughly with a preparation composed of four parts of deliquesced crystals of carbolic acid, two parts of spirits of turpentine, and one part of chloroform. After raising the temperature of the tooth to that of the body, in warm water, re-insert and press it firmly up to its place; adjust the stirrup; then pass a silver wire around this and the two adjoining teeth, just at the margin of the gum, and tighten it by twisting the ends together, clinch, or bend down the ends of the stirrup over the wire, and the tooth will be firmly secured. Direct an aperient for three succeeding mornings, light diet for a week, and aconite and iodine on the gum in case of inflammation. Remove the splint in from three to six weeks. This is the best

treatment for a hopeless case of pyorrhea alveolaris confined to a single tooth, or for replanting and transplanting in any case.—CROTCHET.

I AM prompted by reading the answers to T. L.'s inquiry in regard to fracture of sectional blocks (January number of the DENTAL COSMOS) to venture an opinion. I was, up to about two years ago, often made very unhappy by finding broken blocks, not after commencing to file, but as soon as I could get the plaster off, and I had so much trouble that I looked for that the first thing. As the rubber was often pressed through the place, it led me to suppose that the breaking occurred in the first part of the work, or when the flask was first clamped after packing. One day, when I was in a special hurry, a case coming out badly broken, I was mourning over it, when my wife remarked: "If I should put a porcelain dish into hot water, as you do those teeth, I should expect the sudden and extreme change in temperature would crack it." Now, that is what I have done before, and I know many others do the same. I kept the water boiling that I used for heating my rubber, and, after the flask was packed ready for clamping, would put the case into the boiling water to soften the rubber. Nearly always the teeth were cold up to that time, as I never boil out the wax except in partial cases; so that there was a very sudden and I believe fatal change of temperature, as the sequel seems to show.

With all the care I could bestow upon cases before, they were often broken, and since that time, about two years, I have only had one block fractured, and that I broke by hurried and harsh filing. Now I never subject my blocks to sudden extreme heat, but always make the change in temperature gradual, taking the same care as before in other things; especially using the S. S. White dental plaster, which comes in tin pails. This plaster seems to hold the teeth firmer and better than any other I ever used, and is more dense when hardened.—R. M. PELTON, East Tawas, Mich.

DENTAL CARIES.—It is a source of great satisfaction to know that the etiology of dental caries is being carefully investigated, and it would seem that something at least approximating the truth as to primary causes would be evolved from these extensive and carefully conducted researches.

Probably every intelligent dentist has a theory upon this subject, which, without much personal research, he would be able to defend in a measure. But it is quite probable, judging by the methods of investigation now pursued, that no one theory now held by the profession can be reconciled with *all* the facts that chemistry and microscopy have recently brought to light. There is one question that every one investigating this subject should settle at the outset—that is, whether one should be divested of preconceived opinions, or whether it is well to examine the different theories and the evidence bearing upon them, and "tie up" to the one based on the strongest evidence, and investigate from this stand-point. Entire freedom from bias would seem to be the best condition in which to observe every detail revealed in the chemical and microscopical investigation of this subject.

It may be just as well for the student of dental caries to be cautious about expressing too broad opinions at this time. Conclusions formed from reasoning by analogy are useless, because, strictly speaking, there is no other disease of the animal body analagous to dental caries.

The paper by Dr. W. D. Miller, in the January issue of the DENTAL COSMOS, is a judicious presentation of this subject, though a disappointment to some. The caution he shows is one of the most commendable features of the article.

It was my good fortune recently to have the oppurtunity of studying a number

of Dr. Miller's preparations of decayed dentine. His methods of staining are such that the micro-organisms alone are affected. The bacteria that filled the canaliculi were mostly micrococci, though in some specimens a few bacilli were seen. None of these organisms approached the *base* of the specimen—that is the portion of dentine nearest the bottom of the cavity. Most all the specimens were from teeth still in the mouth, the piece in each case being lifted out bodily from the cavity by first cutting around it with a spoon excavator. This fact proves beyond a doubt that bacteria are relatively a long distance from the line between the normal and abnormal dentine. These specimens are a revelation of the fact that in almost every species of decay bacteria are found in the *softened* mass, in such overwhelming numbers in some specimens as to startle one who might have only a vague idea upon the subject. But, again, there are portions of the dentine equally soft as that infected in which there are no organisms at all.

But let us look at the facts still further. Dr. Miller's method of staining accomplishes but one thing—it shows clearly the locality and amount of bacteria, but it does not show the observer the *exact* line at which the "bond of union" is broken. Therefore no clear conception can be had of the absolute extent to which the softening process has advanced. Now, suppose we take a decayed tooth, one with an ordinary-sized mesial or approximal cavity, and grind down a part of it, including both the affected and unaffected portions, to extreme tenuity. Quite a considerable portion of the softened dentine will be retained in the specimen. If it is then immersed in a reagent that will stain every portion of the affected basis-substance, but which will not stain the unaltered dentine, and will not injure any bacteria present in the softened dentine, the microscope will accurately show the exact point at which the "bond of union" is broken, and the distance of micro-organisms from that point. Chloride of gold (one-eighth per cent. in distilled water) is such a staining-fluid; the specimen is to be left in the fluid from ten to twenty minutes, then transferred to dilute acetic acid (one or two per cent.) for five minutes, and then placed in distilled water and exposed to diffuse daylight for several days, or until a steel-gray or violet tint occurs where the soft spot is located on the specimen. This treatment of the section of dentine is no "abuse" of it, as some writers who are inexperienced may suppose. The gold salt permeates the softened portion of dentine without altering its structure in the least, and exposure to daylight causes simply a reduction of the salt.

The germ theorist believes that he still accords with Dr. Miller when he says that "the structure is destroyed" by the process of decay, while Dr. Miller simply says the "bond of union is broken up." The structure at this point is not broken nor altered in form. There is no difference in structure of that portion in which the bond is broken from normal dentine; or if there is a difference, the microscope does not reveal it. Dental caries is a disease that can only be understood by a study of the subject itself, and there is not much doubt that there are *many different causes.* But as Dr. Atkinson truly says, "We must understand the laws of tissue-building first, before we can properly conceive of a retrograde movement of any kind."

Tooth-tissue (particularly the hard) is different from all other tissues, and its disease must be studied in abstract. Dr. F. Cohn says in his great work on bacteria, that the student must be wary of *pseudo-bacteria.* He then goes on to show how easy it is to mistake the false for the real. I look upon Dr. Miller's work as conclusive so far as the presence of bacteria in the decayed mass is concerned, but they do not even approach the line of softening, according to *present evidence.* At his line the net-work of living matter is in most specimens beautifully brought

out, and as the little branching threads from the main fibrillæ are often focused so as to look like separate bodies, a person who had not carefully studied decalcified specimens of fresh teeth might suppose them to be bacilli.

The germ theory may ultimately be proved true, because the subject is in its infancy, but let each one make investigations for himself and receive the reports of others with caution.

Dr. Lionel S. Beale truly says: "As regards progress, authority is of very little consequence, especially in that department of science in which microscopical observation is included. *Real workers* observe and try to discover facts, and leave *authority* to dictate and dogmatize to those who like to submit."—A. M. Ross, *Chicopee*, *Mass.*

A BOY, fourteen years of age, came to me suffering from severe pain in the second upper right molar. I found the tooth free from decay and in an apparently healthy condition, but peculiar in shape, the grinding surface being much smaller in circumference than the rest of the crown. The pain had been continuous for over three months, but only within two or three days had it been very severe. Disliking to extract a sound tooth, I treated it for a couple of days, hoping to give relief, but the patient returned still suffering, and I extracted and found the following abnormal conditions: Considerable absorption had taken place at the end of all three of the roots; a deposit of what seems to be enamel, the size and shape of a mustard seed, adhered to the side of the palatal root near its apex. The nerve at the end of the same root was enlarged to five or six times its natural size, and was evidently commencing to ossify. In the crown of the tooth I found imbedded a smaller tooth, having every appearance of being a deciduous molar, the crown of which projected the eighth of an inch below the tooth in which it was imbedded, thus accounting for its curious shape. I would like to know the probable cause of these conditions; also, if the growth of enamel on the root had anything to do with causing the pain, or was it due entirely to the enlargement and ossification of the nerve? The boy has received no injuries of late, but at the age of four, was kicked in his face by a horse and all the deciduous teeth in the upper jaw were knocked out. The patient has been entirely free from pain since the extraction of the tooth.—JENNIE KOLLOCK HILTON, D.D.S.

EXPERIMENTS WITH PLASTER OF PARIS.—Mr. Fletcher, of England, referring in the March number of the DENTAL COSMOS to my record of experiments in plaster of Paris says, that "a solution of potash alum, boiling hot, instead of softening plaster of Paris, will make it so hard that it is difficult to cut or break." I have since obtained some of the salt he specifies (sulphate of alumina and potash), but totally failed of success in using it, and should be very grateful to Mr. Fletcher for fuller instructions.

Mr. F. correctly surmises that it was ammonia alum I used. I find that an aqueous solution of sulphate of potassa acts very similarly, preventing expansion, but producing a somewhat softer cast.—STEWART J. SPENCE.

FOR the benefit of readers of "Hints and Queries," I have found a use for broken pieces of separating-files. With a round-faced corundum wheel grind a groove on the flat side the width of the tooth, a little deeper at one edge than the other; then file two notches in the edge with a half-round file. You will have a matrix for approximal cavities in bicuspids and molars any length you desire, and which will hold rubber-dam down and as far out of the way as wanted. It can be applied with ordinary clamp forceps.—NEY CHURCHMAN, *Portland*, *Oregon*.

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ORIGINAL COMMUNICATIONS.

ARTIFICIAL CROWNS.

BY JAMES E. DEXTER, M.D.S., NEW YORK, N. Y.

(Read before the First District Dental Society, State of New York.)

(Concluded from page 235.)

THAT pivoting has endured for so long, and is even now so prominent as a method of artificial replacement is owing entirely to its intrinsic merits as an operation. It seems to me that in cases proper for it—that is, with healthy, strong, and little-decayed roots, in the mouths of equally healthy patients—pivoting must be considered, when properly practiced, as the very best method we have for the insertion of dental substitutes. That there are thousands of disastrous failures in pivoting, does not, to me, detract an iota from the force and truth of this assertion. There are more failures in filling with gold than in pivoting; but shall I conclude, therefore, that gold filling is not to be practiced? I am aware of illustrious precedents for such conclusion. But I am so made (fortunately or unfortunately, as it may be) that I *must* apply the test of my own reason to statements, before accepting them as truth. Pivoting, properly practiced, as I regard that qualification, consists in performing the operation with common-sense. An old, decayed, unhealthy stump is not, to me, a proper site for a pivot-tooth which is expected to be permanent. A Bonwill-Gates crown may be better in some cases than a soldered plate-tooth; and either or both may be the proper crowns rather than those banded or ferruled. To me, as to the old darkey, "cases alter circumstances." But I believe that if I take the proper crown for the proper root and unite them in the proper manner for that crown, root, and patient, I shall have performed the best operation which that case is capable of receiving.

In this connection, I would quote from Prof. James Taylor (in the

Cincinnati Dental Lamp, 1860), as showing, very forcibly, the cause of many failures in pivoting. He says, that "pivots," just as badly inserted plugs, get loose, and unless the tooth is properly adjusted to the fang, and a good pivot inserted, of course, they will get loose; teeth that are stuck in without due regard to fit and adaptation, * * * ought not to be expected to remain." I quote this because, to me, it stands for a cause of four-fifths of the pivoting failures, just as it stands for the cause of four-fifths of the filling failures. I believe these operations fail in about equal proportions, and from the same general causes. In other words, I deem a *properly pivoted tooth* equally certain of permanency with a properly filled tooth.

I believe that I have now described all the typical variations of importance which belong under the heading of pivoting proper; at least, so far as the printed records extend. On the operation in general I intend, later on, to make some criticisms and suggestions. Let it suffice here to say that pivoting teeth is, or *should be*, like any other artificial replacement (for instance, plate-work) in these general points: that each case is a law unto itself, and should direct the practice to be pursued in it: and that *any one system of pivoting, applied to all cases as they occur, will soon form a record of failures.*

I will now go on to another division of my subject. That which would follow here, in the natural order of selection, would be the struck, stamped, or formed gold crowns, attached to the root by screws, pins, or pivots. But the types of these I have already described under the head of Dwinelle's, Morrison's, Beers's, and Talbot's crowns. I will therefore pass to those operations composed of porcelain crowns with metallic rings around both crown and root, and a central pin of attachment. These, also, I have anticipated somewhat, in describing Dr. Dwinelle's arrangement of 1855. The only other important recorded modification of this process is that very recently introduced by Dr. H. W. F. Büttner, of which the following is a concise description:

A special set of instruments is used in this process. Those for preparing the root are drills, reamers, and trephines (Fig. 36). The drill bores out the root-canal. The reamer cuts the face of the root level, being guided by a central pin. The trephine turns the neck truly cylindrical for a certain distance up or down its sides, being also guided by a center-pin. The root, thus prepared, is shown in Fig. 37. The drill, reamer, and trephine, are in various and exactly corresponding sizes.

A steel wire is now placed in the root, projecting half an inch. An impression is now taken, the wire projecting through it; a cup with an opening over the root being used for that purpose. The wire is withdrawn carefully before removal of the impression from

the mouth, but is afterward replaced. Over it, on the impression, is now slipped that one of a set of brass root-models (Fig. 38) which corresponds to the drill and trephine used, and the model is then made, and holds the brass root-model in its place, with the wire projecting. The latter is now removed, and plaster cut from around the root-model to a depth sufficient to accommodate the cap which is to follow. This is of gold, struck out of the solid, on that one of the accompanying steel dies which accords with the trephine and root-model used. It also has a central pin to correspond with the drill which enlarged the root-canal (Fig. 37). This cap is set on the root-model, and a plain plate-tooth, ground hollow on the inner surface to cover the outer wall of the gold cap, is backed, and soldered in place on the cap,—of course, after removal from the brass root-model,—the solder forming the palatal contour. The whole is now polished, placed on the root, and driven home with a mallet (Fig. 39).

FIG. 36.

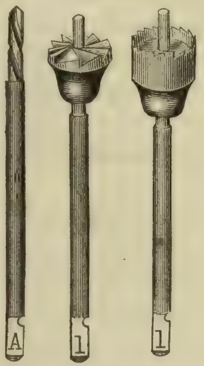


FIG. 37.

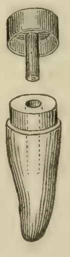
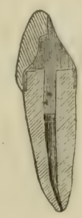


FIG. 38.

FIG. 39.



The perfectly accurate fitting of this operation is secured, beyond cavil, by the set of drills, reamers, trephines, dies, and root-models, with which it is performed. Probably,—indeed, almost certainly,—this is the *strongest* method of attachment of artificial crowns to natural roots which can be devised. Indeed, the only thing breakable about any given case of this method seems to be the porcelain crown or face. The end and interior of the root, also, are absolutely preserved from moisture for, at least, a very long time. The steps of the process seem to be all *certain*—and *unalterable.* These are, according to Dr. Büttner's paper, the main ends and principal recommendations of his process. Finally, the operation has been pronounced by high authority the very acme of tooth-pivoting, or words to that effect.

I am compelled to dissent from that dictum very strongly, if it was meant for general application, and quite warmly even as to the

particular and most suitable cases for the employment of this process. But I will not now leave the shady and pleasant path of description for the rocky and difficult road of criticism and argument. Let us proceed to the final phases of artificial crown setting which remain to my pen. These are crowns of replacement attached to *other* teeth, and what is known as "bridge-work," a variation—or, rather, extension—of the first-named form.

These operations are comparatively recent, generally speaking. That is, there has been very little done in their direction except during the last few years. But, as will be seen, they spring from remote times. Nevertheless, the records are very barren in their respect, and I shall have to be content with offering you a few, mostly very recent, examples of these processes. I have selected, for illustration, operations of Drs. Bing, Litch, Webb, and Register.

Chronologically, the methods of these gentlemen should properly be the last recorded in this paper; for the so-named "bridge-work," although much the most extensive operation, preceded them by many years. Indeed, it is owing solely to the present improved methods of using filling-materials that these operations are done, or even possible. But as bridge-work has come to be simply an extension, in degree, of the principles of these processes, I shall describe it last, although it appeared first.

Dr. B. J. Bing, of Paris, France, was the originator of the process of attaching artificial crowns, without plate or clasp, to adjoining natural teeth by fillings. His method is first described in the Dental Cosmos for 1869, vol. xi., page 509, in a letter of Dr. H. D. Bennett. The description is copied, as follows:

In the case of inserting a central incisor, "a cavity must be made in the palatine depression of the adjoining central and also the lateral, and one in the approximal surface of either of these teeth, about the place where we usually find decay on these surfaces. An impression is then taken which will show these cavities, and a gum or plain plate-tooth carefully fitted and backed with gold, observing the precaution of allowing a small point of the backing to extend into the approximal cavity. Two little griffes (bars) are then soldered to the base of the backing, the ends of which are carefully plugged into the palatine cavities, with gold foil, in such a manner as will tend to draw these teeth very slightly together."

The operation reads like a very simple one; but I can assure you it is not, practically, so easy as it seems.

Dr. Wilbur F. Litch has made what seems to me to be in some respects a decided improvement on the plan of Dr. Bing. He describes his method in vol. xxii. of the Dental Cosmos, 1880, page

396. An abridged description is as follows—supposing a left upper lateral to be inserted.

Take an accurate impression of the parts (canine and central, and gum between) and make metallic dies from the model. Swage gold or platinum plates to very exactly fit the palato-approximal surfaces of the canine and central. Fit into the interspace a plain plate lateral incisor, slightly wider than the space to be filled, beveling and grinding the sides posteriorly so that the tooth cannot be forced backward between its neighbors; the neck fitting accurately, but lightly, upon the gum. Back the tooth with gold. Place the prepared tooth and the struck plates upon a perfect model of the parts, and adjust the tooth-backing accurately to the plates on each side. Cement together with shellac, or other resinous cement, remove, and complete the final adjustment in the mouth. Invest, and solder the tooth and plates together in their exact relative positions, observing to accumulate a

FIG. 40.

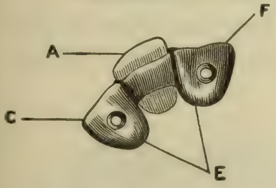
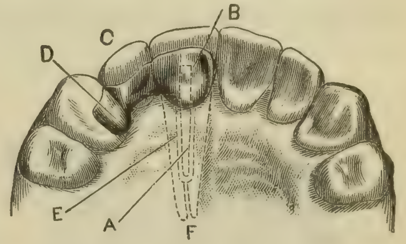


FIG. 41.



large portion of solder over the joints (Fig. 40). The apparatus, if now placed in the mouth, will be found self-supporting against any force except the perpendicular; for it cannot be forced backward into the mouth, owing to the extra width of the lateral; nor forward out of the mouth, owing to the wings or plates extending over the backs of the neighboring teeth; nor upward toward the gum, owing both to the porcelain-tooth resting thereon, and to the converging planes of the plates or wings and the posterio-approximal surfaces of the artificial tooth.

The methods of final attachment are two, depending upon the case: 1. If one of the neighboring teeth is devitalized, attaching a pivot to the plate on that tooth, and inserting it with gutta-percha, the plates themselves being covered with a film of the same substance on their dental aspects (Fig. 41). 2. If the teeth are both alive, a modification of Bing's plan of filling, performed as follows:

The denture being constructed as before described, and polished, drill a cavity in the center of the palatal face of each tooth covered by the plates, slightly larger in diameter than the head of the pin in an ordinary rubber-tooth, no deeper than the enamel, and under-

cut (B, Fig. 42). To each of these openings fit a platinum one-headed rivet, the head being very thin and perfectly flat on each side. Split the shanks of the rivets nearly to the head (A, Fig. 42). Make openings in the plates to exactly correspond with those in the teeth, and countersink them deeply on their palatal aspect. Place the gutta-percha on the dental surfaces of the plates as described, and press the denture to its place in the mouth. When the cement is cooled and hard, remove that portion pressed into the holes in the plates and teeth, pass the rivet-heads through the holes in the plates to their seats in the tooth-cavities, and fill them in position with gold. When the fillings have reached the level of the tooth-surfaces, spring open the split rivet-shanks, and continue packing gold around and between the separated parts and into the countersinks in the plates until flush with the plate surfaces. Cut off the surplus pivot-shanks and finish (Fig. 42).

In the peculiar fitting of the apparatus to its place lies its superiority over the method of Dr. Bing; for, since the denture is so formed as to be self-supporting against any force but that of grav-

Fig. 42.

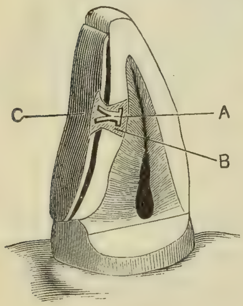


Fig. 43.

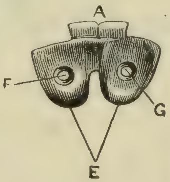
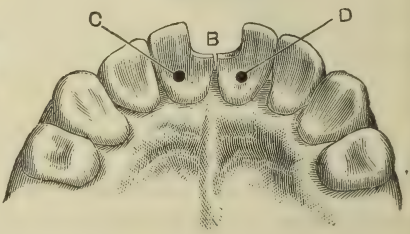


Fig. 44.



ity, the fillings are called upon, as it were, to support only the weight of the appliance; and, therefore, all the practical strains are distributed over the large surface covered by the plates and the tooth itself; and the fillings, the especially vulnerable portions of all such operations, remain in almost entire security against movement. But this perfect result depends entirely upon the absolute accuracy of the fit *before* filling into place. No lining of plastics will compensate for loose joints in this method. I can conceive that such an operation, when properly performed, will be very beautiful and durable.

Although not strictly in line with the present subject, I cannot refrain from drawing your attention to Figs. 43, 44, as an illustration of the adaptation of this process to replacing broken incisor corners or tips; an operation often very desirable, yet generally

failing from want of strength in all usual methods of attachment in such cases. Here we have strength in plenty. The illustrations need no further description than to say that tips or corners, containing pins, and properly ground and fitted, are soldered to such a plate or plates as have been just described, which are attached by rivets and fillings.

Dr. Marshall H. Webb (DENTAL COSMOS, 1882, vol. xxiv., page 419), modified Dr. Bing's method by cutting an undercut groove in the porcelain tooth on the palatal aspect, in each side, and along the cutting-edge, and packing gold into the groove and over the sides and cutting-edge, to form a sort of metallic binding to the porcelain as a protection against the breaking of the tooth from the backing and to save its edges from direct occlusion.

Dr. Webb also bent a stout wire into a neighboring devitalized tooth, and soldered the porcelain substitute to its free end, filling the wire into place in the natural tooth with gold (Fig. 45).

Let us now proceed to what is called "bridge-work," or the union of several teeth by a band or bar to natural ones situated some distance apart, or to roots so situated, without the gum-plates neces-

FIG. 45.

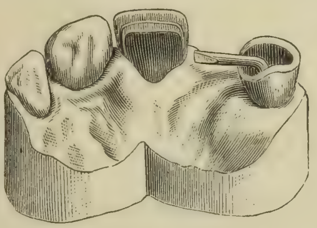
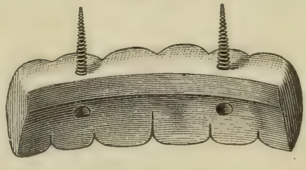


FIG. 46.



sary to the ordinary form of artificial dentures. And, in doing so, we will change the humdrum relation of the things of the present for that of the epoch generally sighed for and regretted by mankind, and familiarly known as "the good old times," or words to that effect.

In 1725, one hundred and fifty-eight years ago, was published, in France, the work of "Pierre Fauchard, French dentist." This original work I have never seen; but the kindness of Dr. A. L. Northrop has given me access to a German translation thereof, with (very excellent) plates, made in Berlin in 1733, by one Andre Theil. I have said "a German *translation*," but the fact is, that the translation is, at present, almost untranslatable, except in the most liberal manner; it being a curious compound of Dutch, German, French, and old Latin, often entirely meaningless to the modern reader, and always so obscure as to render correct interpretation a

labor of very great uncertainty. Hence I have not endeavored to transcribe its text. But, while the pen is thus silent, the pencil can speak all languages, and I have copied the plate which is before you (Fig. 46). You see plainly that this is a true bridge. There is no plate, the denture being evidently carved from a single piece of hippopotamus tooth. The mode of attachment is by pivots to two roots, six teeth being mounted and supported thereon.

This is the earliest record of bridge-work which I have been able to find. Singularly enough, it is also the earliest illustration of *any* dental apparatus that I can discover. Yet I have lately seen some, and heard much more of, work which differs from this only in being constructed of gold and porcelain instead of ivory, and which is claimed as a new thing and a great discovery!

Let us now take a long step, from 1733 to 1820. C. F. Delabarre, at that date, published his great work on dentistry, and I was certain I should find reference to bridge-work in its pages, nor was I disappointed. Indeed, I found him particularly rich in descriptions bearing upon our subject. From several I select the following:

Human teeth united in series by a vertical (Figs. 47, 48) or horizontal (Fig. 49) band, or by a square bar with backings (Figs. 50, 51). In the first-named form (Fig. 47) the teeth are filed to fit the

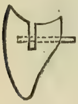
FIG. 47.


FIG. 48.


FIG. 49.

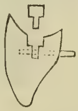

FIG. 50.


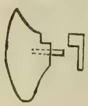
FIG. 51.


FIG. 52.


gums, and then slit on their gum-faces to admit the vertically-placed band, to which they are attached by pins piercing both horizontally; or their palatal surfaces are filed flat (Fig. 48) to receive the flat band (Fig. 52). In the second form (Fig. 49) the slit is horizontal and the pins vertically placed. In the third form (Fig. 50) the slit is enlarged in its beginning to receive the square bar, on which perpendicular plates are soldered to correspond to each tooth, the pins of attachment being passed horizontally through the teeth and plates. Or (Fig. 51) the teeth are filed flat on their palatal or lingual faces, and a square recess is cut out at the gum-margin to receive the bar, the plates extending along the flat backs, and being pinned thereto. Fig. 52 shows the square bar carrying the backings. The latter form reveals the so-called *new* bridge-work even more distinctly than the older appliance of Fauchard.

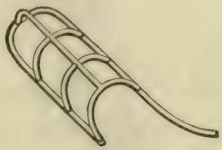
These partial dentures were retained *in situ* by the supporting bars or bands being continued behind the adjoining natural teeth, and by their lateral pressure against the latter. This is shown in

Fig. 53, also from Delabarre, in which still another form of attachment of teeth and bar, the staple, is seen. Another mode of attachment, the wire frame, appears in Fig. 54; the frame fitting around and over the natural teeth, the top-piece passing along the line of the great sutures, and the cross-pieces between the teeth.

The only essential points of distinction between this old-time bridge-work and that of to-day rest in the usage shown in the Bing-Litch-Webb descriptions, of *filling* the connecting or supporting structure into the adjoining natural teeth, and in the absence

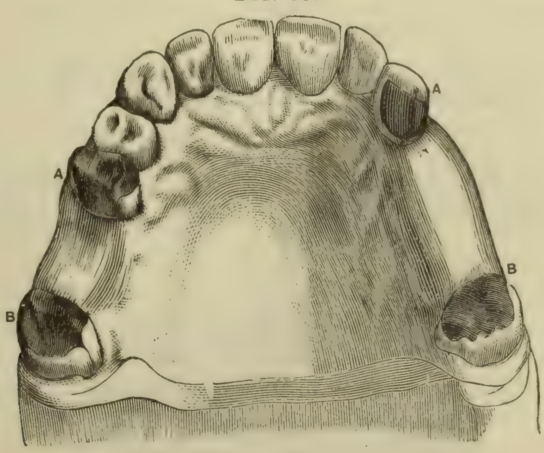
FIG. 53.

FIG. 54.



of the struck metallic caps (over the natural teeth) of Drs. Morrison and Beers, which have also been long in use for the purpose of attachment of intervening series of artificial teeth. It is, perhaps, well for us of to-day that the capabilities of cohesive foil were unknown in the old times, for otherwise Messrs. Fauchard and Delabarre might have easily anticipated all our modern triumphs.

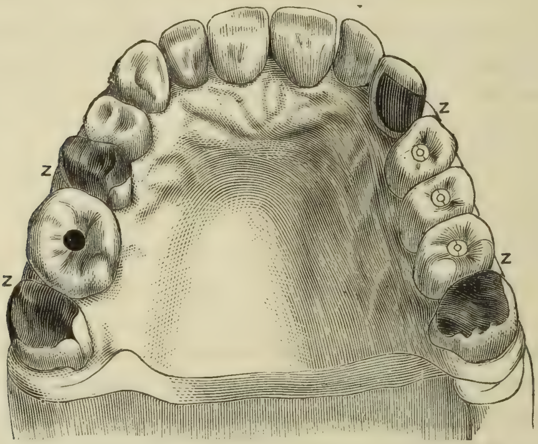
FIG. 55.



Dr. H. C. Register, in the DENTAL COSMOS, vol. xxiii., page 257, describes his method of bridge-work. This he states he began to manufacture six years before, which would place its initial date at 1875. Taking a typical case (Fig. 55), a rim or saddle of gold, platinum, or iridinized platinum is struck to fit the spaces between the teeth A and B. To this are attached bars, X, Fig. 57, to enter the

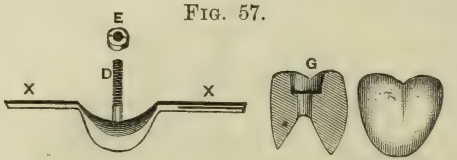
fillings at Z, Z, (Fig. 56). Posts or pivots (D, Fig. 57) are soldered upon this saddle where the artificial teeth are to be placed, their free ends being threaded to carry the nut E. Hollow crowns, countersunk for the nut at G, and having the necks ground to reach over the

Fig. 56.



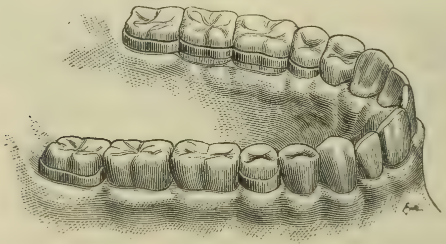
saddle and press upon the gum, are fitted over each post. Amalgam is used to fill in the space between the post and the tooth-wall, as in a Bonwill setting, and the crowns are drawn to place and held

Fig. 57.



with the nut. The saddle is fixed in its place in the mouth, before the crowns are finally attached, by filling into the cavities Z, the bars X, X.

Fig. 58.



On March 15, 1881, there was granted a patent to James E. Low, of Chicago, Illinois, for the form of bridge-work shown in Fig. 58. In this method clasps or bands are fitted around the teeth on each side of the space to be filled, and connected on the palatal side

by bars or continuous backings, upon which ordinary plate-teeth to fill the space are mounted. The clasps or bands are cemented in place upon final adjustment of the fixture in the mouth. The principal peculiarity of this method is that the bases of the artificial teeth are not fitted to the gum, but remain at some distance from it, thus enabling the wearer to clean the mouth *under* the denture without its removal. This appliance, as will be readily seen, is objectionable in three very important particulars: 1. The pseudo permanency of the bands or clasps. 2. Want of cleanliness *in the denture itself.* 3. Impossibility of repair except at much trouble and damage to the denture or natural teeth or both.

A strong recommendation of the Register form of bridging lies in the fact that, should any porcelain crown be broken, its place can easily be filled without disturbing the main fixture. But all *permanent* bridge-work fails of value, and even becomes highly objectionable, because of this circumstance of broken porcelain. Think of the number of porcelain teeth which are broken from ordinary artificial dentures. In such cases they can be easily replaced, and breakage is a thing of comparatively little moment. But in a prospective case of an extensive and *immovable* bridge, a possible broken tooth,—it may even be said, a *probable* broken tooth,—must make us pause.

In this lies one of the greatest objections to permanently fixed bridges. Their breakage is a thing of such actual possibility as to form a serious obstacle to their use. The strength of artificial teeth is not, by any means, a thing of sure dependence. Especially is this the case with the Bonwill, Weston, and other specially-made crowns now in the market. Plate-teeth, the strongest of all, are liable to breakage, and do break all too frequently; but these new crowns are to plate-teeth as chalk to marble. The newest form of crown, the How, of which I have told you, is, so far as I have seen them, of very weak material. The Bonwill, Weston, Foster, and How crowns are all soft and seemingly chalky in texture, so much so as often to break even in mounting. I am not acquainted with the mysteries of artificial tooth manufacture by our dealers, and this fact has always been a cause for wonder to me. If the dealers will give us the special crowns of strength even equal to that of plate-tooth material, we must be satisfied. But why a hollow porcelain crown or shell which, from its very form and for its particular uses, should possess greater inherent strength of material than all other artificial teeth, is really made of weaker material than any others, is a thing which passes my comprehension. I hope the manufacturers will take note of this.

Another objection to permanently fixed bridge-work lies in its want of cleanliness. This was supposed to be obviated by the Low

method. But, while the gum under the bridge could certainly be readily cleansed, the apparatus itself, like nearly all soldered work, becomes a place of lodgment and retention for oral débris of all kinds, which it is simply impossible to perfectly remove.

On these accounts I have devised a change in the method. I have now in hand a piece of *removable* bridge-work, which I had hoped to have finished in time to show you to-night, but could not do so. The case is one in which there remain in the mouth (lower jaw) two wisdom-teeth and a canine and bicuspid upon each side. The teeth are very much worn down, but firm and sound. I make loose caps to set over them, connecting the caps by stiff bridges on which are set the artificial substitutes. The caps extend down the sides of the teeth only so far as to obtain a hold upon them; the better to do which, each is slit perpendicularly in two or three places, and the sides bent somewhat inward, so as to spring to place. Such an apparatus is firm and efficient in use, and exactly as capable of repair as any ordinary plate. It is also readily removable by the patient, who can thus easily keep both it and its supporting natural teeth perfectly clean. This latter point removes the chiefest objection to the struck cap as a permanent attachment. The apparatus is, finally, almost as easily made as an ordinary metallic plate, from which it differs, in principle, only in resting upon the teeth instead of the gums, the split caps taking the place and function of the ordinary clasps.

I have now described about fifty different kinds of artificial crown replacement. These range, in point of time, within the past one hundred and fifty years, and, as to place, include the civilized portion of the world. Many as are the modifications presented to you, however, I think I could easily double, and perhaps triple, the number described. That I have not done so is because I have endeavored to present, so far as possible, only typal modifications, believing that the various changes in form or manner from those given in these papers, are mainly the offspring of the circumstances attending individual cases, and not such as would affect any general practice.

I say, I have presented only typal *modifications*. It comes to me, with singular force, as I review my investigations, how few are the really *generic types* of artificial crown replacement. Reduced to the last subdivision, there are really only three main forms, the *pivot*, the *ferrule* or cap, and the filled-in bridge, or *graft*. At first thought, I was struck with what appeared to be the peculiar dearth of invention in this matter of main types; and yet I cannot say that invention has been at fault, when I remember the many modifications deduced from the few generic forms obtainable. It seems to me, that the circumstances of the kind of tissue upon which we work, and the peculiarities of the place we are called upon to work in, are

really a bar to any further change of types for artificial crown replacement; just as in the problem of aqueous navigation we *must always* use vessels lighter than the water; or, as in electric communication, we *must* always have a connection betweeen places superior to the air in conducting qualities. But the forms and attendant uses and variations (aside from their specific gravity) of our vessels may be almost infinite; nor are we, probably, near the end of them as yet. Also, the changes possible in ways of electric communication, while always subject to the laws of conduction, may be indefinitely multiplied. And so it is, and probably always will be, with artificial crowns.

Of the three main types, each may be again divided into sub-types in various ways and from various points of view. For the purpose of recording some ideas upon the subject, I will divide them here as follows:

The pivot form may be broken up according to *conductivity of thermal changes.* Thus we have, on the one hand, all those forms in which *metal is brought in direct contact with root-substance, while at the same time exposed to the changes of temperature* so constantly occurring in the mouth; and, on the other, those in which *the root is protected by non-conductors* from all exposure to thermal change.

We all now know perfectly well the injurious effects to be apprehended from direct contact of metal and dentine in filling teeth. So general is this knowledge becoming that it is rapidly changing practice in this branch. Non-conducting linings are now in common use, and my belief is that their employment will greatly increase. The non-conducting plastics, as we all know, want only durability to become the most valuable of filling-materials. Gold, the long-time king of plugs, must now be prevented from doing damage by varnishes in the cavity, by linings of gutta-percha or the zinc plastics, or by encircling him with a zone or belt of mummified protoplasm in the body of the dentine, through use of creasote, alcohol, *et id omne genus.* For the late discoveries in dental histology, in showing us that a live tooth is not only alive in the pulp but *alive all through its substance*, have shown us also that we must now avoid irritating the living matter in the dentine, as we formerly did that in the pulp itself. To this end we line cavities, varnish cavities, and coagulate the albumen in the tubuli abutting upon cavities.

Now, why does not all this apply as well to the *root* in *pivoting* as to the *crown* in *filling?* In the root we have a body much more highly organized than the crown; or, at least, the living matter so abundant in the cementum and pericementum, is much nearer the metal tube, or screw, or filling, than it is to the filling in the crown, and it may be supposed to receive more directly and more acutely

the shocks of thermal change. True, the very excess of vitality in these parts gives them greater powers of resistance to attacks from without. But "dropping water wears away the stone," and their vitality must, it seems to me, suffer defeat in time, with the result of pericementitis, acute or chronic, and other ills.

The ferruled artificial crowns seem to be very open to this objection, particularly when conjoined with screws or pins passing directly into the dentine, and still more particularly when the ferrules, or pins, or both, are in direct metallic connection with the broad surface of a gold backing, or a cap or whole crown of metal. Added to this mischief of conduction, in these crowns, is to be apprehended the direct irritation of the ferrule edge upon the gum-tissue, or, if deep enough, upon the pericementum.

The caps, struck up over crowns, or parts of crowns, are open to the further objection of actually inducing decay of the parts they are designed to protect. He who makes these will doubtless cry out at me now. But I do not seek to rule his practice, but only to give the ideas which rule my own in these matters. I do not think it is possible to make more than one cap in five which can be absolutely depended upon to protect from oral fluids the crown it covers, and if it does not do this, it is worse than useless. Because it is tight (with aid of plastics) at first, because it performs its office admirably for one year, two years, it is not necessarily successful therefor. If the crown would have lasted longer uncapped than capped, it would have been better, in my opinion, to have left it uncapped. Perhaps some will say, "you cannot determine that point." Exactly so! and for that very reason I prefer not to institute the *possibility* of having to make the comparison.

On account of the dangers which, to me, seem to lie in the effects of thermal changes upon root-tissues, I must record myself as opposed, on principle, to all methods of artificial crowning *in which metallic connection is continuous from crown to root-substance.* Of course, temperament and organization have much to do with the duration or action of any operation, and I do not wish to be understood as stating that no such operations can be permanently successful. On the contrary, many such do succeed. But I like to be safe, or as nearly so as possible, in my oral ventures, and I interpose non-conductors as carefully in placing crowns as I do in placing fillings.

I thank you all heartily for the kind attention and appreciation with which you have heard me. If I have given you half the pleasure in the hearing that I have experienced in the writing of these papers, I am much gratified. And if I shall have aided any in his endeavors, or added to his knowledge, the aim of my labor will have been fully attained.

MOUTH-BREATHING AND ITS ATTENDANT EVILS.

BY PROF. GUY F. WHITING, M.D.

Lecture at the Clinic of the First District Dental Society, State of New York, January 2, 1883.

GENTLEMEN: I have been honored by the request of your committee to address you upon some subject relating to my specialty—the diseases of the throat and nose. There are many interesting subjects in this anatomical division of diseases, and not a few offer tempting inducements to select them as the subject of the present paper. To many the objection can be raised that, though they may be generally interesting to the profession, yet they have no direct bearing upon the important branch to which you have devoted your energies; and so I have passed them by for one which will, I hope, interest you both generally as physicians and specially as dentists. In considering what subject I should speak upon to you this afternoon, I at first thought of cleft palate and the relation which it bears to your branch of the profession, but I excluded it for fear that I should be "carrying coals to Newcastle," for I realized the intimate knowledge of it which you all possess. I have finally chosen for my topic, "Mouth-Breathing and the Evils which it entails."

I have selected it for four reasons, any one of which should justify its acceptance. First, because it is interesting to the general profession; secondly, to the specialist; thirdly, to you who have it in your power to materially assist us in remedying the defect; and fourthly, because so few authorities have written upon it. The chief, and almost the only one who has devoted any time to this important subject is an eminent physician of this city, and it is from his interesting monograph, entitled mouth-breathing, that I have taken many of the points which I shall later on present for your consideration. The author to whom I allude is Dr. Clinton Wagner.

I suppose that the main reason why the literature of this subject is so scarce, is the fact that the evils which follow in the train of this trouble have not been referred to their proper cause by the physicians under whose care this class of patients have placed themselves. This error in the etiology of these troubles is due to no lack of observation or care on the part of the practitioner in studying the symptoms of his patients, but is really due to his not availing himself of the ready means of diagnosis which the rhinoscope puts in easy reach of any one skilled in its use.

It has always struck me with surprise that so few among our most distinguished surgeons deem it necessary to acquire a knowledge of the use of this little mirror. All of them, or nearly all, know how to use the vaginal, the anal, and even the aural specu-

lum, and do use them; but only a few ever avail themselves of the rhinoscope, which gives such a satisfactory view of the vault of the pharynx and post-nares. And it is especially surprising when we consider that it is by the use of this instrument alone that we are enabled to obtain a view of these parts; parts, I may add, which are frequently the seat of disease, and whose derangements are the most frequent cause of obstructed nasal respiration and the resulting mouth-breathing.

Although the effects of obstructed respiration, due to derangement of the post-nares or vault of the pharynx, are prominent, and we may say, characteristic, yet we could not, before the invention of the rhinoscope, always determine the nature of the obstruction, and often arrived at it only through the process of exclusion, and even then our opinion was based merely upon a surmise, and was far from satisfactory. Now that the value of this little instrument is known, its use should not be restricted to the specialist, but it should be found in the hands of every surgeon and general practitioner; for, without it, they cannot skillfully treat diseases of those parts which its use brings into view. There are few instruments which can be compared with it as regards the amount of knowledge which its use bestows, and now that it is more generally resorted to we hope that medical literature will not, in the future, be so meager upon mouth-breathing and its causes.

Before we enumerate the causes and the results of obstructing respiration, we will make a hasty review of the mechanism of normal inspiration. When the muscles of inspiration contract, the diameter of the chest and its cavity is increased in every direction. The scaleni muscles draw the ribs upward and forward, assisted by the external intercostals, and thus increase the cavity of the chest in its antero-posterior diameter; these muscles also act in a certain manner antagonistic to the diaphragm, which, in contracting, has a tendency to pull the ribs inward. This action of the diaphragm is exerted only upon the lower ribs, as I shall show you later on. The vertical diameter of the chest is increased by the descent of the diaphragm during contraction. When there is need for more forcible inspiration the shoulders and the base of the scapulæ are fixed, and the more powerful muscles of inspiration come into play. The chief of these are the serratus magnus, the latissimus dorsi, and the pectorales. These muscles having thus enlarged the cavity of the chest by their contraction, there would be a tendency towards the production of a vacuum, did not the external air rush in to fill the increased space, being drawn in by suction.

Now, it is my object to prove that the nostrils are the only proper entrance for this volume of air, and to point out the evil consequences

dependent upon the other mode of breathing; also, to demonstrate the manner in which this injurious mode of breathing is brought about and how it may be remedied. Little need be said in proof that the nostrils are the proper entrances for air going to the lungs, and I shall content myself with stating a few of the changes to which the air is subjected while passing through the cavities of the nose, and with showing that these alterations are absolutely necessary to the existence of good health.

Man was intended by nature to be a nose-breather, and the habit of mouth-breathing has been acquired through carelessness or is the result of some nasal or mouth trouble. The infant from birth always breathes through its nose; unless it did the action of sucking could not be performed, for it must breathe through its nose while the mouth is applied to its mother's breast. I have frequently had nurses bring infants to me, complaining that they would not take the breast, and that whenever they attempted to do so they would be prevented by being seized with an attack of coughing. This coughing, I may here say, is produced by the milk entering the larynx, the child making a sudden and deep inspiration while the lower portion of the pharynx is full of the fluid. An examination often shows that all the little patients' troubles are the result of an accumulation of the nasal secretions, which occludes the nostrils and renders them impervious to air. A thorough cleansing of the nostrils entirely relieves the infant of all trouble.

Honsell, who was interested in this subject of mouth-breathing, gives statistics of over three hundred infants he had examined during sleep. He found that about 95 per cent. breathed solely through the nose, that the mouth was kept firmly closed, and that the tongue was in constant contact with the hard palate. I have made a few examinations to test these statistics, and I find that my observations agree entirely with those of Honsell.

It is said that man is the only member of the animal kingdom that resorts to the baneful practice of mouth-breathing. Among savages a mouth-breather is seldom found. Catlin says, "I have seen a poor Indian woman in the wilderness lowering her infant from her breast and pressing its lips together as it falls asleep in its cradle in the open air." From this it would seem that savages fully realize the dangers of breathing with the mouth open, and take every precaution against their children acquiring the habit.

Wagner says, "athletes fully appreciate the importance of nasal respiration. Professional trainers always insist upon those under their charge keeping the mouth closed while exerting their physical powers. Especially is this the case in boat-rowing, and also in the popular, but much abused, walking matches. The individual in

the ring, who, with lowered head, opened mouth, and curved spine, with shoulders inclining forward and inward, prevents the free action of the chest-muscles, will never win a walking match; he has not the stamina to carry him successfully to the goal ahead of him who practices normal respiration through the nose." The horse, one of the swiftest and most enduring of animals, never breathes through its mouth, but, in running, has the mouth tightly closed and the nostrils opened wide.

One may readily ask, why is there such a great difference between mouth and nasal respiration? Since the object is to convey air to the lungs, what difference does it make whether the air goes through the mouth or through the nose? It makes a very great difference whether we breathe through the mouth or through the nose,—a difference which none of you will be slow to appreciate when you observe an habitual mouth-breather. To show in what this difference consists I have only to demonstrate the changes which the nostrils, thanks to their anatomical structure, produce in the volume of air, a change which the mouth is incapable of producing.

In ordinary air there is floating more or less dust and other impurities, which, if borne into the larynx or bronchial tubes would have a very irritating effect upon their delicate mucous membrane. Nature has provided our nostrils with the means of filtering the volume of inspired air of all particles of dust and other impurities, and for this purpose has placed at their entrance innumerable hairs, which catch the dust as the current of air passes by them. Besides this, the moist and freely secreting mucous membrane which covers the turbinated bones, has also this purifying effect. We have all frequently noticed, after traveling on the railroad, how much dust has accumulated in our nostrils, and thus been prevented from entering the larynx and lungs, which would there have set up a troublesome irritation and hyperemia. This dust, after having lodged upon the moist membrane lining the cavities of the nose, is swept out by the action of the ciliated epithelium.

Being deprived of its dust is not the only change to which the air is subjected while passing through the nostrils. The mucous membrane lining the nasal cavities is freely supplied with blood-vessels filled with warm blood, and the cold air coming in contact with their warm surface, its temperature is rapidly raised to a degree approximating that of the body, so that there is no chilling effect produced upon the mucous membrane of the larynx and bronchial tubes. That the temperature of the air is increased during its passage through the nose can be satisfactorily demonstrated by breathing in a cold atmosphere alternately through the nose and

the mouth. In breathing through the mouth we can distinctly feel a cold volume of air enter the larynx; but when we close the mouth and breathe through the nose we can no longer experience this sensation.

Now that we have studied the effects of the nostrils upon the air, let us examine the action of the latter upon the nostrils and the neighboring parts. It is to nasal respiration that we owe the sense of smell, for the inspired air bears the odorous substances with which it is impregnated to the superior portion of the nasal cavity where they come in contact with the terminal filaments of the olfactory nerve, and we perceive their characteristic odors. This power of perceiving odors is not only a pleasure but a safe-guard to our health, for it informs us of the presence of deleterious gases, and thus warns us to escape from their baneful influence.

The inspired air acts as a natural stimulant upon the glands of the nasal mucous membrane, causing them to increase their functional activity, which is to secrete a thin, lubricating mucus, which serves to keep the cavities of the nose not only moist, but in fact washes from them any particles of dust or dried and tenacious secretions which may have accumulated in them. That this is a fact is demonstrated in the case of the confirmed mouth-breather, in whose nostrils the nasal secretions, accumulating and dessicating, often give rise to the most distressing form of nasal catarrh—the so-called ozena. The secretions in these cases, having accumulated and dessicated, finally decompose, and in this state, acting as an irritant upon the mucous glands, cause a change in the character of their secretions, which, from being thin and watery and possessing no odor, become thick, tenacious, and very offensive. This decomposed material lying upon the mucous membrane of the turbinated bones erodes and gradually destroys it, leaving the turbinated bones uncovered, which, being thus left unprotected, become rapidly necrosed and finally utterly destroyed. Patients in the latter stage of the disease often state that they have been put, by their medical adviser, upon a long course of mercurial treatment, the physician thinking that this condition has been produced by some syphilitic taint. Syphilis, it is true, is one of the most frequent causes of the destruction of the nasal bones; but one should not, on this account, hasten into its specific treatment merely because one finds necrosis of these bones. The vast majority of those in this stage of the disease, non-syphilitic ozena, will rapidly recover if we carefully and thoroughly remove not only the dead, but all the denuded bone; but in addition to this the nostrils must be kept thoroughly cleansed by the use of a disinfectant spray.

Besides this stimulating effect which the air has upon the mucous

membrane of the nose, it has also the effect of preventing the formation of nasal growths, or, as Catlin expresses it, "the nasal ducts being vacated, like vacated roads that grow up to grass and weeds, become the seat of polypi and other diseases."

Breathing through the nose is absolutely essential to perfect hearing, for when it is abolished the mucous membrane of the Eustachian tube shares in the general changes which take place in the mucous membrane of the post-nares and the vault of the pharynx, and the tubes become impervious to air, and consequently the equilibrium of the atmospheric pressure upon the drum-head is no longer maintained, and deafness ensues.

Having thus given a few of the physiological and mechanical effects of nasal respiration, I will now enumerate some of the many causes which tend to abolish nasal and establish mouth-breathing. This latter form of breathing is usually dependent upon the existence of nasal obstruction; but it may be the result of some derangement in the pharynx, is frequently due to an irregularity of the teeth, and often results from carelessness.

The Nasal Causes.—The causes of mouth-breathing of a nasal origin are very numerous, embracing all forms of nasal occlusions, which may be either bilateral or unilateral, permanent or temporary. As regards the nature of these occlusions we may, in general terms, state that they are produced by the presence of growths of almost every variety known to pathology; by a hypertrophy of the normal tissue, by a malformation of the nasal framework, or by the presence of some foreign body. Nasal growths are of very frequent occurrence, and upon examination, are usually found to be attached to the outer wall of the nose, and most frequently to one of its three turbinated bones. Statistics show that of the three turbinated bones the middle is the one to which growths are most commonly attached; and in my experience I have found that their point of selection is the posterior half of this bone. The most common variety of nasal growth is what is known as the mucous polyp. This tumor is of a very gelatinous consistence, easily compressible, and readily adapts itself to the shape of the cavity in which it is located. In dry weather these polypi become smaller through the process of shrinkage, but in damp weather they undergo very rapid increase of size from absorption of atmospheric moisture. This fact is readily appreciable to the possessor of one of these growths, for though his breathing through his nose may be at all times difficult, in damp weather this difficulty rapidly becomes greater, so that he is compelled to resort to mouth-breathing for sufficient respiration. One who has not studied this subject may naturally think that as the polypus obstructs only one of the nostrils the other should afford an entrance sufficiently large

to admit the necessary volume of air. He can easily satisfy himself that this very natural supposition is false, if he will only close one of his nostrils and watch carefully the effects of this occlusion. At first he may feel no inconvenience, but let him continue breathing for some minutes, limiting himself to the use of one nostril, and he will soon find that the action of his chest-muscles has increased and respiration has become more labored. Should he, while in this condition, attempt to take any active exercise, such as rapid walking, he will find that he will soon have to open his mouth and resort to it for the necessary supply of air.

When we lose the use of an arm or a leg we usually find that the other undergoes an increase of strength, and it is said that this same law of compensation applies to the different organs of the body. We often see it demonstrated in the loss of a kidney, or the unilateral loss of the sense of hearing, the organ on the opposite side undergoing an increase in its functional activity. This general law of compensation does not hold good in regard to the nostrils, and that fact is due to their peculiar anatomical construction. In the first place, their posterior portion is composed of firm, unyielding, osseous walls, so that, from the nature of things, the diameter of their cavities cannot undergo an increase. Now, on the other hand, I wish to show that, so far from the occlusion of one nostril producing a corresponding or compensating increase in the diameter of the other, it actually diminishes its caliber. This diminution is produced by the cartilaginous portion of the ala being drawn inwards by the increased suction-power resulting from the abnormal action of the inspiratory muscles. This theory has not, to my knowledge, been advanced by any authority, but it is, I think, easy of demonstration. I will illustrate it by a diagram on the blackboard. [Drawing diagram on blackboard.] This is intended to represent an air-pump, and this a rubber bag, perforated by two holes of unequal size; in the larger is inserted a tube, connecting the bag with the pump, while the smaller one allows air to enter the bag, but only a limited volume. If the pump is worked the air will be drawn out of the bag faster than it can enter through the small aperture which regulates its supply, and the atmospheric pressure will cause the walls of the bag to cave in, and thus, more or less completely, prevent air from entering the pump. This is exactly what happens to the nostrils when their entrances are in any way obstructed, for the cartilaginous portion of the ala is drawn inwards towards the septum.

Another effect which occlusion of one nostril has upon the other is, that the occluded one not being used, there is an increased flow of blood to the other, which often gives rise to congestion and

hypertrophy of the tissue covering the turbinated bones, and then both nostrils become, in course of time, more or less impervious to air. These turbinated bones are always liable to inflammation, and are the portions of the nose most frequently diseased.

Congestion of the Schneiderian membrane, in cases of acute or subacute rhinitis, often gives rise to temporary nasal obstruction. Some people are peculiarly liable to these attacks and, in certain seasons of the year, are seldom free from them. This continued congestion frequently results in hypertrophy; the hypertrophy being most marked in and limited to the tissue covering the turbinated bones. In these cases nasal respiration is more or less difficult; and should the patient contract a fresh cold, complete obstruction may supervene and nasal respiration be rendered impossible. Acute rhinitis sometimes gives rise to edema of the septum. This edema is usually most marked at the posterior border of the septum and its adjacent surface, the mucous membrane of this portion of the septum being less adherent to the underlying structure than elsewhere. This edema, though very marked, is seldom discovered by an examination made through the anterior nares, but is readily brought into view by the rhinoscope. The posterior portion of the septum presents on either side—for edema is generally bilateral—a bladder-like tumor. The mucous membrane covering the edematous portion is of a pale color, resembling very much in form and appearance a large serous blister.

The remaining class of nasal obstructions is that dependent upon malformation of its osseous and cartilaginous framework. The most usual form of this variety is dependent upon what is commonly known as the deviated septum. This deviation may be either unilateral or bilateral. The bilateral form is known as the S-shaped septum. This deviation of the septum may be so slight as to be scarcely appreciable, or it may be so marked as to almost entirely close the nostril. The most common form of deviation is unilateral, and it is the anterior portion which is usually involved; but, of course, in the bilateral form, both the anterior and posterior portions of the septum are involved. The inferior meatus, which is the chief respiratory channel of the nose, is sometimes occluded by the presence of a bony protuberance or exostosis, springing from the crest of the superior maxilla at its junction with the septum. These cases are, in my opinion, generally of a congenital origin, for upon inquiry you will find that the patients were never free from difficulty in breathing. There have been a few cases of congenital unperforated nostrils reported, but I have not been so fortunate as to see any. We may have stenosis of the nares, resulting from scalds or syphilitic contraction, but these cases are quite rare. Paralysis of the dilators

of the nostrils is said to effectually prevent the passage of air through the nose. Cohen has reported an interesting case of mouth-breathing from this cause. Children not infrequently force small objects, such as marbles, buttons, pebbles, and other substances, up their nostrils, which become lodged there and produce nasal obstruction.

Pharyngeal Causes.—The pharyngeal causes of obstructed respiration, are due to the presence of some tumor, or to cicatricial obstruction resulting from scalds or syphilitic ulceration. The most frequent tumors found in the pharynx are adenoma, springing from its vault, exostosis of the vertebral column, and gummata of the soft palate and of the post-pharyngeal wall. These latter often attain sufficient size to entirely separate the superior from the inferior pharynx. We not infrequently find nasal respiration obstructed by the soft palate being united, partially or throughout its entire length, to the posterior wall of the pharynx; this union having been produced by the healing of burns or syphilitic ulcers. Cicatricial contraction of the pharynx often results from these same causes.

Mouth Causes.—One of the most frequent causes to be found in the mouth is the presence of enlarged tonsils. These hypertrophied glands are most frequently seen in early childhood; a period of life in which habits, and especially that of mouth-breathing, are most quickly acquired. These glands, in the state of hypertrophy, produce obstruction by pressing the velum of the palate backwards and maintaining its free edge in contact with the posterior wall of the pharynx. They sometimes attain sufficient size to meet in the middle line, and then offer complete obstruction to nasal respiration and render even mouth-breathing difficult.

The different tumors of the mouth, by preventing its closing, may give rise to the habit. The most frequent seat of these tumors is either lingual or sublingual. Wagner says, "I have known an elongated uvula to act as a cause. When the mouth is closed the velum is relaxed, and inclines downwards and forwards, the uvula comes into actual contact with the epiglottis and excites a short, hacking, irritating cough, accompanied by an unpleasant tickling sensation. If the mouth is opened, retraction or raising of the soft palate takes place, and the uvula is drawn upward and backward from contact with the epiglottis; the patient, observing the relief which follows opening the mouth, acquires gradually the habit of mouth-breathing."

Irregularity of the teeth, preventing proper approximation of their crown surfaces and perfect closure of the mouth, is one of the frequent causes of mouth-breathing. Too great protrusion of the upper incisors has the effect of preventing the lips from coming into close

contact, leaving a space between them through which a current of air rushes during inspiration. I have frequently noticed patients who, without nasal or pharyngeal obstruction of any kind, continually kept their mouths partially opened. After a careful study of these cases I have come to the conclusion that their trouble is due to an abnormally long tooth preventing the lower jaw from closing evenly upon the upper, and thus preventing the condyles of the inferior maxilla from entering the posterior division of the glenoid fossæ, which position they assume when in a state of rest. By the exercise of the will the mouth may be kept closed for a short time, but the muscles soon tire and the jaw again drops. Again, this dropping of the lower jaw may be merely due to a habit contracted during a prolonged sickness, resulting in general relaxation of the muscular system. The effect of the relaxation of the temporal and the internal pterygoid muscles is often noticed when one falls asleep after undergoing great fatigue. The early development of large wisdom-teeth before the angle of the inferior maxilla has become well pronounced prevents the proper closing of the jaws. This lack of approximation may also be due to paralysis of the motor branch of the fifth nerve, and in these cases mastication is seriously interfered with, if not totally abolished.

Now that we have reviewed the causes giving rise to mouth-breathing, let us study the effects of this habit. In this connection I cannot do better than quote from Wagner's work on this subject. He says: "The habitual mouth-breathers can be at once recognized; there is no mistaking them, as the practice stamps itself indelibly upon the physiognomy. The retracted lips, the open mouth, receding gums, protruding teeth,—especially the upper ones—shrunken alæ, diminished size of the orifice of the nostrils, the wrinkles at the outer angles of the eyes and the lines extending from the alæ of the nose to the angles of the mouth, give the wearer an idiotic and silly expression which is by no means agreeable to look upon."

Catlin, in speaking of these cases, says: "In all of these instances there is a derangement and deformity of the teeth, and disfigurement of the mouth and the whole face, which is not natural; carrying the proof of a long practice of the baneful habit, with its lasting consequences, and producing that unfortunate and pitiable, and oftentimes disgusting expression which none but civilized communities can present. Even the brute creation furnishes nothing so abominable as these, which justly demand our sympathy instead of our derision. The faces and mouths of the wolf, tiger, and even the hyena and donkey, are agreeable and even handsome, by the side of them."

Some of you may consider this picture somewhat overdrawn, but

I am sorry to say that such is not the case, and regret exceedingly that I have not one of these cases to present to you.

The effects of this habit are not limited to the face, for, unfortunately, the whole constitution is more or less vitiated. The blood is not perfectly aerated, consequently the vitality of the tissue is lowered. This is very noticeable in regard to the brain, which becomes very inactive, and naturally makes the person stupid and dull, and deprives him of all vivacity of manner. When this habit is contracted in early youth, development is very slow, and may almost entirely cease, and one who would have had, under natural conditions, a fine and robust frame, grows to be puny and sickly. A common result of obstructed respiration is the production of the deformity termed chicken-breast. Lamron describes this peculiar malformation as a circular depression of the walls of the chest at about the junction of the lower and middle third. The thorax seems as if it had been confined by an unyielding ring, which, while contracting its growth in this situation, gives an appearance of abnormal bulging to the upper part of the cavity. This circular depression corresponds with the attachment of the diaphragm internally to the osseous framework of the chest, and is evidently due to the constant and energetic contraction of that muscle to overcome the obstacle to free respiration. In childhood the bones yield easily to such influences; and any one who has witnessed the difficulty of breathing which occurs, especially during sleep, when there is any considerable hypertrophy of the tonsils, will readily understand how pernicious may be the effects on the respiratory apparatus.

The nasal effects I have already described, and need not reiterate them here.

The pharynx and larynx, and I may say, the trachea, are kept in a more or less hyperemic condition; and in the case of the pharynx a condition known as *pharyngitis sicca*, the most troublesome form of pharyngitis is produced.

The effect which it has upon the lungs is also disastrous. The lungs not being fully dilated, many of their cells become atrophied and the power of the lungs thus materially diminished; and these atrophied portions may eventually become the seat of serious lung trouble.

As regards the effects which mouth-breathing has upon the teeth, I shall say but little, for my attention has only of late been directed to this class of the evils of mouth-breathing, while many of you must have studied them for years. I merely refer to them in order that some of you may be induced to make a few remarks upon the subject, for I am anxious to be instructed upon this point. In examining these patients I have often noticed that their teeth were more

or less decayed, and that the incisors, principally those of the upper jaw, had minute cracks in the enamel running vertically down their anterior surfaces. This defect of the enamel I have thought might be due to the sudden thermal changes to which the teeth are subjected when not protected by their natural covering, the upper lip. The most favorable condition for the preservation of the enamel of the teeth seems to be dependent upon their being surrounded by moisture, for, when deprived of this moisture, they soon lose the highly polished and shiny appearance of their surface.

I will not trespass further upon your time by giving a lengthy discourse upon the treatment of these cases. As I have already stated, they are either dependent upon some nasal or pharyngeal obstruction which, in most cases, can be easily removed; or they are due to irregularity of the teeth, which fault, thanks to your skill, is readily rectified.

I very much regret my inability to present to you for examination typical cases of mouth-breathers. Several promised me to come, but, as I expected, they have not been heard from. My regret at their absence is all the greater, knowing as I do how clearly their appearance would illustrate to you the disastrous results of the habit they have contracted. Although regretting their absence, it does not surprise me, for, being afflicted with such a disgusting appearance, they naturally do not wish to be put on exhibition, where they stand no chance of being compensated by drawing one of Bunnel's prizes for beauty.

The attention of a few scientists has been drawn to the peculiar and sad results of this habit. Tyndall says: "If I could leave a perpetual legacy to mankind I would embody it in the words, 'keep your mouth shut;'" and Catlin expresses himself still more strongly when he says: "shut your mouth and save your life." Even Shakspeare who has written sage advice upon most of the affairs of the human race, has not forgotten us here, for he warns us to "shut the mouth and stretch the nostrils wide."

THE USE AND ABUSE OF AMALGAM.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

Read before the Kansas State Dental Association at Lawrence, Kansas, May 2, 1883.

WHATEVER may be said against amalgam as a filling-material on the score of ethics; however much we may deprecate its extensive and increasing employment, and regret the consequent decadence of high art in the execution of gold operations throughout the pro-

fession, the gigantic and stubborn fact remains that its employment for filling teeth *is* most extensively prevalent, and is on the increase. The presence of amalgam with us is a tremendous fact which we must accept, and accepting must study. It is a great factor in the dental economy of the day, which cannot be ignored, and we are utterly unable to prohibit its use, even were it as pernicious as some would have us believe.

On purely ethical and artistic grounds, objection is made to amalgam on the score of its being an ignoble, filthy, degrading material, unfit for the touch of the members of a high and noble calling. The protests of the all-gold critics are not aimed so much at its practical value and tooth-conserving qualities, as against its plebeian origin and nature. The cry of the golden esthetes is, in fact, a caste prejudice, an ostracism of this Pariah among filling-materials, because of its low pedigree. We are told that no dentist worthy of the name will use such a degrading material, that it compromises not only his professional but also his personal dignity and purity; that the miserable ease with which it is stuffed into cavities tends only and forever downward, with the result of the rapid depreciation of operative skill, the decadence of art, and the retarding of the cause of the artistic propaganda which was the hope of the masters in operative art. But we are *not* told that we should abandon it because it is worthless practically, that it cannot save teeth, that its conserving quality is a failure. Its practical value to the practitioner stands unchallenged, and therein is its strength, the one cause of its universal use to-day and of its increasing popularity. In point of fact it saves more teeth than any other filling-material, taking teeth of all qualities as they come to the dentist, and taking all grades of operators as they occur in the ranks of the profession. The poor workman and mediocre operator, who constitute the vast majority of the dental rank and file, can make better amalgam than gold fillings in all grades of teeth as they meet them in daily practice, and with amalgam they can save more teeth than they possibly could with gold. For this reason amalgam saves more teeth in this country to-day than gold, and is more generally useful.

Out of the great army of dental practitioners in the United States, of all grades and assorted abilities, there is but a small per cent. who are capable of using gold as it should be used, and of saving teeth with it as they should be saved; a somewhat larger proportion work gold indifferently well, with some success, but not as the highly favored and artistic few: but the great residue use little gold and much amalgam, because they can thereby do better work and more faithful service to their fellow man, and therein they are right. They can fill teeth with it easily, rapidly,

and cheaply, and therein they are right, for it brings serviceable tooth-saving within reach of a great many people who cannot afford the services of even the ordinary gold operator. Yet, in view of this great economic fact, the gold tyrants would utterly prohibit the use of amalgam and let all these people go without the service of even the indifferent tooth-saver. The artistic difficulty of working gold is with them a chief recommendation, in that it excludes all men of mean degree and low abilities.

It is an indisputable fact, of course, that the use of amalgam will not contribute to the development of artistic ability in the working of gold throughout the mass of the profession; but there remain, also, the facts that the mass of the people cannot be brought up to artistic gold prices, and that without just compensation high art cannot be developed in any department. Art must have its wealthy patrons or it cannot flourish, and especially is this true of artistic tooth-filling. Good gold filling cannot be performed without good fees, and the classes of people in this great land, where wealth is so unequally distributed, who can compensate the skillful operator for his outlay are not sufficient, so to speak, "to go around." Therefore there must be a cheaper material that is reliable and serviceable, and amalgam is that material. A high artistic ability in gold work must, therefore, go down before a cheaper material. These are disagreeable facts, but we must take things as we find them.

And yet amalgam is not necessarily degrading, and the poor operator is not alone in his use of it. A candid and discriminating judgment compels its employment at times even by the best operators—*i. e.*, by those who are good men and who have the greatest good of their patients at heart. Thus conscientious men often find themselves obliged to use amalgam when they would prefer to use gold; but it becomes a question between amalgam and extraction; amalgam performs services which are beyond gold, and saves teeth which gold cannot save, and so the honest operator will save teeth with amalgam rather than not save them at all. This is the honest and judicious practice, the exercise of true eclecticism in the selection of filling-materials. Extreme theories of practice are proverbially unsafe and dishonest. We must follow the safe middle path of conscientious, unbiased eclecticism.

In practice it is the peculiar condition or quality of the cavities, or of the teeth, or of their surroundings, that indicates the superiority of amalgam to gold as a conserving material in given cases. For instance, in very soft, friable, or chalky teeth, accompanied by a permanent condition of acidity or ropiness of the saliva, superabundant mucus, lymphatic temperament, with, as is too often the case, a chronic habit of neglect of systematic cleansing,—it is madness

and dishonesty to fill cavities in such teeth, especially when large and difficult, or upon the approximal and buccal surfaces of the posterior teeth with gold. Every candid operator will admit this proposition. It is better to fill every posterior or concealed cavity with amalgam, for it is particularly indicated in these teeth as the most serviceable conserving material. And why? Because the congenital softness, brittleness, and sponginess of the walls and margins of cavities in teeth of the class described will admit of a better joint—more nearly water-tight—being made with amalgam than with gold. The softness and elasticity of the walls will not possibly permit of perfect condensation of the gold against them, and leakage is inevitable; but the plastic condition of amalgam, taken with the advantage of slight expansion on hardening, for all amalgams do expand slightly, permits a more perfect coaptation, and a more nearly water-tight joint is made. In addition to these advantages, as if to support and supplement the inherent weakness of the tooth and the difficulty of saving it, the ultimate oxidation of the amalgam will assist in its preservation, be it ever so soft, if the work is at all well done, by rendering the dentos more dense and less soluble. This oxidation is caused by the attack of the acids of the mouth upon the metals of the amalgam, where they expend their energy instead of attacking the weak dentos, thus creating oxides and sulphates, which permeate and harden the dentos. In this the amalgam performs a vicarious and noble duty, and the unsightly blackening becomes a blessing. But with gold the acids attracted by the metal, as all metals in the mouth do attract and condense acids, are concentrated upon the gold and attack the tooth-margins of the cavity, while the gold remains exempt from injury, thus performing a harmful office.

In very soft teeth, therefore, we hold that it is better to fill all unexposed cavities with amalgam, but in those of a little harder grade, medium-soft structure, which are well cared for (an important factor, to be considered in all dental operations), cavities in positions which are kept well cleansed, or on the buccal or grinding faces, should be filled with gold. Such cavities are the first in the lowest grade of teeth, the first in the scale as we approach the better organized, which will admit of gold. All cavities possible should, of course, be filled with gold, and the possibilities begin with the class we have described; but the approximal cavities in these teeth, especially the larger ones, should yet be filled with amalgam. This is a conscientious discrimination. Or, perhaps, these approximal cavities might be filled with tin or amalgam faced with gold on the masticating margins. It is an abuse of amalgam which has brought much of the condemnation of the gold-workers upon it, that it is employed where gold should and could be used, because

gold, where it can be employed, is, *per se*, a better and more elegant and durable material, *as* a material.

In the anterior teeth amalgam is inadmissible, except where they are of very dark structure and belong to very filthy persons. We have all unfortunately met with such mouths, and certainly neither the teeth nor the persons deserve gold. Sometimes, however, an unoxidizable amalgam can be used to advantage in teeth of better quality for covering a grooved cutting-edge with weak walls, or in cavities beneath the gums, or on the posterior sides of the incisors. As a rule, however, it cannot be employed in visible positions. As a country-woman recently remarked, she "did not want any of that *blue* filling in her front teeth," and we agreed with her. In anterior teeth of medium structure, of course, gold must be used, and in the medium-soft if well cared for,—the conical shape of the teeth facilitating cleaning and preservation. In those which are very soft or very frail, however, some other of the plastics must be used.

Amalgam is also indicated in teeth of the better qualities where the walls are thin and weak from excessive decay. The danger of breaking under the gold while filling, or the almost certainty of breaking away from the gold afterwards, points to its rejection and the substitution of amalgam as the wisest thing to do. Amalgam will support frail walls, will not spread under mastication (as gold will do, and strain the walls), and the oxidation, though unsightly, will aid in the preservation of the decaying dentos. It will also avoid the suffering and pain incident to protracted gold operations, which is a matter not to be disregarded when we think of the long train of evils likely to follow upon a severe nervous prostration. Besides, the large amalgam fillings are almost certain to endure longer than those of gold, even when performed by the very best and most artistic operators. To prove this we will only refer to the fact, noticed by all of us in practice, that very large amalgam fillings which have endured and been in active service for from ten to twenty years, are of not infrequent occurrence; but that very large gold fillings which have been so enduring and serviceable in similar positions, are conspicuous by their rarity. This is a fact which needs no comment, but is at once suggestive and decisive.

Cavities, in inaccessible and inconvenient positions, which cannot by any possible exercise of ingenuity, be filled well with gold are, for many reasons, far better filled with amalgam. A good amalgam filling is better than a poor gold filling in any position. It is possible in difficult places to make a better operation, to reduce the amount of suffering required and render better service, than by attempting to use gold and make but an indifferent operation of it at best. We need but refer to those cavities high up on the necks of molars,—

approximal especially,—or to those difficult and most unsatisfactory fillings upon the buccal faces of wisdom-teeth. Indeed, wisdom-teeth as a class, taking them as they come, are more likely to be better preserved with amalgam than with gold, because of their inherent softness, the impossibility of operating upon them satisfactorily, the pain inflicted and the endurance required.

Teeth which are so seriously affected with calculus, Riggs's disease, protracted ulceration, or any other lesion which renders them loose and insecure, should not have their usefulness, or, indeed, their very existence endangered by the force and any appliances necessary for filling with gold. Amalgam is easier and safer, and fully as serviceable. The same argument may apply to large fillings over pulps which have been previously exposed and inflamed. They must be handled with care, for a pulp once inflamed is never after in normal health, and the force of gold filling in the cavity or in the socket, may easily arouse a stubborn pulpitis or pericementitis.

Deciduous teeth are also better preserved with amalgam than with gold, on account of their usual and normal softness. It is easier of insertion and saves the little patients hours of needless suffering. The permanent teeth during childhood and adolescence are also better preserved by being filled with amalgam, on account of their softness during the growing years. Gold nearly always fails in childhood, but in adult age can be inserted with safety and assurance of of success. Then the amalgam can be removed and replaced with gold, thus allowing it to perform a temporary service and a better one than gold was capable of. During the growing years the oral fluids seem to be more acid and corrosive, but on attaining maturity they seem to become neutral or alkaline, and the enamel to acquire a density and polish unknown before. Then it is safe to refill with gold.

Patients whose physical condition is such as to render them unable to safely endure protracted or painful operations, should have amalgam used as largely as possible. Very frequently the lack of health and strength, either from a chronic malady or convalescence after acute disease, or pregnancy, etc., is such as to forbid the infliction of much pain, and disregard of the indications of insufficient strength will sometimes precipitate a latent disease as a catastrophe, or even create a nervous disturbance which becomes chronic, if it does not imperil life itself. For invalids of all kinds we must, therefore, exercise the most judicious and careful discrimination to the end of not inflicting more evil than we cure. The achievement of fine operations will not always justify the risk to the patient.

We must notice lastly those occasions when to use amalgam is to abuse it. The principal one is, of course, to fill teeth with it which indicate by their texture, quality, and environment, that they de-

serve to be filled with gold and that they would respond favorably to its conservative powers. This is the place where the mediocre operator fails of his high calling and abuses his trust; he therein abuses amalgam. But, yet again, he is justifiable on the ground that he is doing the best *he* can for his patients—he employs a material he can manipulate most successfully and with which he can save most teeth, and therein he is right.

But, again, the best of us abuse amalgam by using it in teeth worthy of gold, on the score of economy to the patient, who is unable to compensate us for gold operations. We are obliged to employ amalgam ofttimes out of charity, for the teeth of the poor must be saved and they cannot pay for high-class fillings. The benevolent practitioners, with a flourish of large-heartedness, have frequently urged that we should fill the teeth of such patients with gold, at any rate, for charity's sake; that the gratitude of an appreciative soul and the approval of one's conscience is sufficient reward, etc. But there are few of us who could stand the rush of charitable business that such generosity would entail, much as we might admire the sentiment and desire to put it into practice. Besides, the men who are the most vociferous in advising this benevolence would be the last to practice it. The ordinary practitioner usually has as much charity practice, intentional and otherwise, as his strength and means will allow. So it is that we are forced into a position of apparent compromise by being obliged to fill teeth with amalgam, which should be filled with gold, on account of the poverty of the patient. But it is not a compromise if we advise the patient that the amalgam should be considered tentative, and that as soon as convenient he should have it removed and gold inserted instead, thus reducing it to a temporary expedient. If the time never comes when he can afford this, his teeth will still be preserved for service and benefit. In the use of amalgam, as in all things else in practice, we must exercise an intelligent, careful, and candid discrimination, praying and striving to free ourselves from prejudice and the fear of criticism, and at all times to do that which shall be for the greatest good of the patient, regardless of either "New Departure" proclamations or "Conservative" anathemas.

Although a reckless candor prevails throughout this paper, and although the writer is aware of the denunciations which have been hurled at amalgam and amalgam advocates, and which may await him, he cannot but believe that he has voiced the sentiments of almost every conscientious operator, and depicted his every-day practice, though the fear of criticisim and dread of the anathema of the Inner Circle of Conservatism has deterred him from announcing his beliefs and practices.

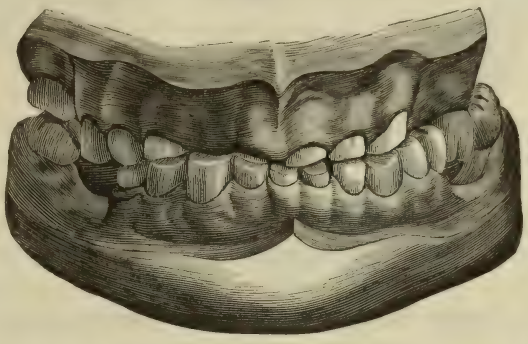
A CASE OF ARTIFICIAL SUBSTITUTION.

BY C. F. W. BÖDECKER, D.D.S., M.D.S.

(Read before the First District Dental Society, State of New York.)

The case I here present you is shown in two models, one taken before and one after the operation. The patient is a gentleman about forty-five years of age, of good constitution. The first model (Figs. 1, 2, 3) shows nine teeth in the upper jaw,—four in-

Fig. 1.



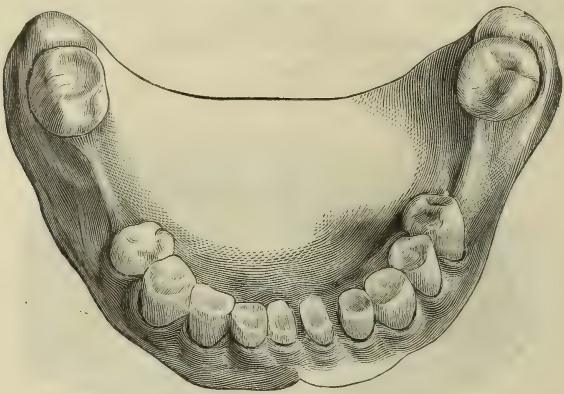
cisors, two canines, right first bicuspid, and right third and left first molars; and twelve in the lower jaw,—four incisors, two canines, four bicuspids, and right and left third molars. The upper front teeth were worn down very much, especially the right central, the

Fig. 2.

distal margin of which was one thirty-second of an inch above the gum. The lower teeth were not so much worn as the upper. The articulation of the original bite (Fig. 1) was such that mastication was performed entirely by the front teeth. The upper and lower

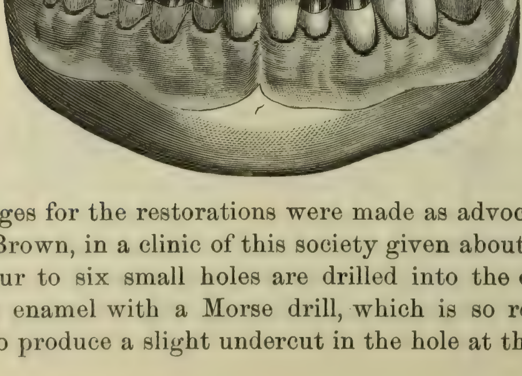
right third molars occluded only upon a very small surface. On the left side, the lower third and upper first molars passed each other when the jaws were closed. Several years ago the patient applied to a dentist, who advised him to wear the teeth down until all their pulps were exposed, when he would restore them with gold!

FIG. 3.



The teeth which I restored by filling are nine, the right third molar of the upper jaw and two lateral incisors, two canines, the right first and second bicuspids, the left first bicuspid, and the right third molar of the lower jaw. Of these, all are alive except three, the lower laterals and right lower first bicuspid; the pulps of which were so nearly exposed that I found it advisable to remove them.

FIG. 4.



My anchorages for the restorations were made as advocated by Dr. E. Parmly Brown, in a clinic of this society given about a year ago, viz., from four to six small holes are drilled into the dentine very near to the enamel with a Morse drill, which is so rotated while drilling as to produce a slight undercut in the hole at the same time

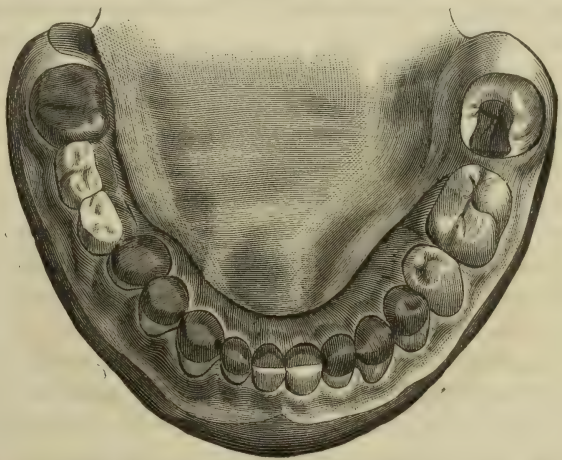
that it bevels the hole's edge. The enamel around the cavity is also well beveled and made smooth. Thus is obtained a very firm support for the fillings. The gold used was Kearsing's cohesive foil, No. 4, folded to No. 16, in the drill-holes, and No. 30 foil for the

FIG. 5.

remainder of the fillings. It was packed with the electro-magnetic mallet.

As the upper front teeth were very much worn down, and as gold restorations here would be very conspicuous, these teeth were re-

FIG. 6.



stored with Dr. Büttner's artificial crowns, as shown in Figs. 4 and 5. Their lingual aspects are filled out with eighteen-carat gold, and their attachment to the roots is very firm and serviceable. This crown is, in my opinion, the best artificial substitute yet offered to the profession.

After the setting of the six upper artificial crowns and the upper partial gold plate (shown in Fig. 5), I noticed that the marked protrusion of the lower jaw, seen in Fig. 1, gradually disappeared, and that the jaw, in about two weeks from the operation, assumed its former (and normal) position, as seen in Fig. 4. This change, unlooked for by me, compelled the reshaping of two of the lower fillings. The lost lower teeth (evident in Fig. 3) were replaced by artificial substitutes on a gold plate (Fig. 6).

THE PHOSPHATES AND OXIDES.

BY E. S. NILES, BOSTON, MASS.

(Read before the Connecticut Valley Dental Society.)

THE subject of plastic cements is one of great interest to the dental profession, and as the public grow to dislike the showing of gold in the mouth, the greater is our desire to find a durable tooth-colored filling-material. But many years must elapse before a certain class of patients will fail to look with a degree of pride and gratification on the beautiful combination of gold and ivory as a matter of oral decoration, and it is safe to say that no one now in practice will live to see the day when gold will not be considered a necessary material for filling, and we may expect the continuance of the present exacting demands regarding plastic materials.

Many earnest and faithful investigators are searching among the metals, salts, acids, etc., and many in the profession are hoping that nature from her laboratory will give the ideal filling-material. Such a material must first of all work well or mix easily and smoothly; it must set neither too slow nor too fast, and either under water or out of it; it must not make the tooth ache nor generate heat or cold in setting; when set it must be as hard as flint and of the exact color of the tooth, and be more difficult of solubility than the tooth itself; must keep for any length of time under any condition of climate and atmosphere and be always ready for use. These and many other qualities are desirable, but we shall probably die without having found such an accommodating compound.

That a better filling-material than we now have will be found is not unlikely, but it will be one possessed of qualities requiring a knowledge of the chemistry of its action to enable us to work satisfactorily with it,—not a secret compound, but one which we may modify to a given case in our own laboratory.

Few dentists realize the durability of that class of fillings known as phosphate of zinc. After some study of the metals, salts, and acids that enter into this compound I am led to this conclusion. These filling-materials, prepared and used with the same care as

gold and amalgam are, will not rank inferior to either except where cutting surfaces are to be formed. I believe that few teeth are filled with what may be called, chemically, phosphate of zinc; but a large proportion of these cements are a mixture of the acid phosphate and oxide of zinc—simply mechanical mixtures held together by a partial conversion of the oxide of zinc into hard phosphate of zinc. Generally speaking, the liquid is phosphoric acid, and the powder reduced oxide of zinc. As we all know, when these two substances are mixed another substance is partially or completely formed,—a phosphate of zinc. If the whole of the powder or oxide is converted, a mutual compound or salt is the result, which is quite insoluble in the fluids of the mouth and of great durability.

It may be asked, cannot the materials be prepared in such a way that their best properties can be developed by those who use them? They may, but unless the operator has a better knowledge of the matter than may be got from the accompanying directions it will be simply good luck if the mixing is done properly in one-tenth of his cases.

The study of chemistry in theory is of little use without practical work. Although told in our school days that certain agents react upon each other, this teaching would not have impressed the mind had we not handled the reagent bottles until we knew them thoroughly. The attempt, therefore, to detail the characteristics and delicate modifications of phosphoric acid, zinc oxide, actinium, etc., would be of little value to any one without a knowledge of this branch of chemistry.

I am aware, however, that many are hard at work experimenting with these materials, and that cements for fillings are growing in favor with many who are glad of all the information obtainable.

I have found in the preparation of "Lithoid cement" that the darker powders are the most durable and the least soluble. This is accounted for by the fact that the darker oxide has been reduced nearer to the metallic state. The salt is more soluble than the metal, and just in proportion as the salt is reduced to the metallic state, in that ratio will the durability of the material be increased.

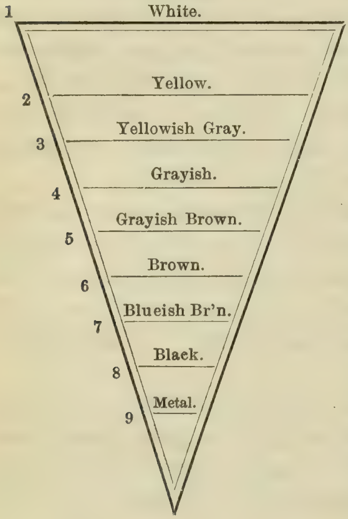
The different stages of the reducing process give a variety of colors which may be illustrated by the following diagram (see next page).

The process of reduction is as follows: Place the oxide to be reduced in a closed Hessian skittle-pot or crucible and seal it securely from the air with fire-clay; place it in a furnace and fuse at a high heat. No oxygen can get to the oxide, and its oxygen and color are given up as the heat increases in the order illustrated in the diagram until the metallic state is finally reached.

When the ore is mined the oxide is reduced to the metal by a

similar process, with the exception that charcoal or other reducing agent is mixed with the oxide in the crucible; but in the preparation of an oxide for our purposes a reducing agent is not admissible, as will be readily understood.

The amount of heat to produce the required sub-oxide can only be ascertained by practical experience in the management of the fire. I have in my laboratory five or six varieties of color of the oxide of zinc, tin, and actinium, with silica and their corresponding acids.



In the preparation of the acids a great many obstacles are encountered. In a paper read by me a year ago I pointed out some of the difficulties experienced in getting not only pure salts but pure acids. In the latter are found (in addition to the intermixture of the fine varieties of phosphoric acid and soda) nitric acid, bromine, and iodine, especially in the tribasic variety, making it necessary to treat it first with oxalic acid. Here, again, experience is necessary in handling the acids to enable one to ascertain their required purity and specific gravity.

Two varieties of the liquid may be prepared: First, a thin fluid about the consistence of glycerin. Prepared properly this will unite with the powder and convert it into a phosphate in four minutes or less; in fact, this form of the acid can be prepared so as to convert the oxide to a phosphate almost instantly and with the evolution of considerable heat. Second, an anhydrous variety. This is in the form of crystals, paste, or very thick syrup. By mixing this acid with the powder when moderately warm, and introducing it into the cavity of a tooth, it does not set until sufficient moisture has been taken up from the saliva to allow it to act upon the oxide, and the action continues perhaps for several days or even weeks, the filling becoming at length very hard and insoluble. It will be seen that the anhydrous differs from the other only in the amount of water it contains. The quantity of water absorbed cannot be regulated, and the surface of a filling often takes up too much moisture, making it soft or flaky in such cases. It is better, therefore, in the greater number of cases to use the quick-setting cements, and keep the filling free from moisture until too hard to be affected by the fluids of the mouth. Both varieties have

their place, and are subject to modification to suit any given case.

To preserve this material for any length of time there can be but one way, if the best possible results are to be obtained. It must be kept free from moisture, and that is the most perfectly and conveniently accomplished by sealing up in capsules as suggested by me a year ago.

It is hardly worth while for me to suggest that our schools and colleges of dentistry are the places for the coming dentist to become familiar with this class of compounds. The trouble is that what cannot be quickly turned to practical use is slow to find its way to favor with the profession. Dispatch in practice no one admires better than the writer, but dispatch which does not serve the best interests of our patients should never tempt us from the path of duty.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting held at the residence of Dr. William Carr, Tuesday, February 20, 1883.

President, Dr. S. G. Perry, in the chair.

In the absence of Dr. Rich, who was expected to open the discussion on Dr. Howe's paper which was read at the last meeting, the president called upon Dr. Bogue to address the society.

Dr. Bogue. Mr. President and Gentlemen: your executive committee asked me, as I understand, to repeat pretty nearly what I had the pleasure of writing to the president a few weeks since, and, inasmuch as it may give opportunity for questioning upon those matters, I am very happy to do so.

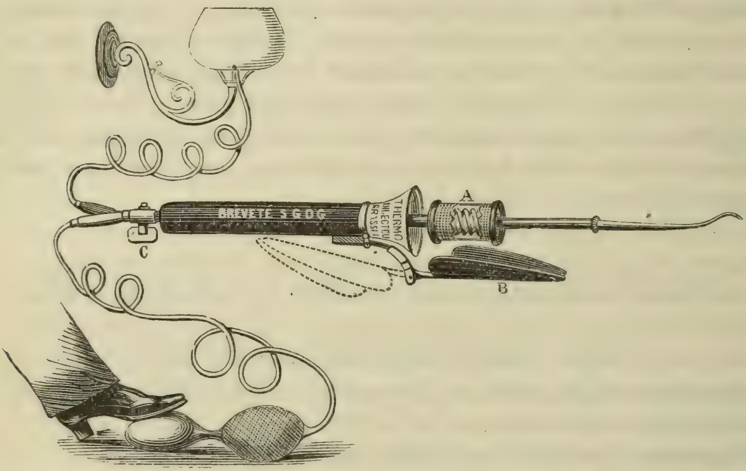
I shall not pretend to bring forward anything new; some of the things are new to me, but they may not be to the gentlemen present. But it has been the practice with a good many of our calling to decry what exists on the other side of the water, and, perhaps, to fancy that dentists there are benighted to a degree. I have seen some things to the contrary, and it is of those that I will venture to speak now.

It may be remembered by several of the gentlemen here, that somewhat more than two years ago, possibly three, I was working upon an apparatus to deliver hot air into the cavity of a tooth while it was being excavated. What was done I showed to Dr. Brasseur in Paris just before leaving, a year ago; upon returning there this summer he presented me with a completed instrument of his own invention. The mode of operation is seen in the little proof that I

had struck off the other day, for he has kindly sent on a plate that may be used in the DENTAL COSMOS to illustrate the instrument.

DR. BRASSEUR'S THERMO-INJECTOR.

This instrument, designed to throw a continuous stream of heated air into the cavity of a tooth that is being excavated, or wherever a small stream of hot air may be needed, is operated by means of



two rubber bulbs acting as a double bellows; the end one, containing the valve, being placed under the foot or under the pedal of the dental engine. The pipe leading from it is connected with the tube in the handle of the thermo-injector, which tube passing through the handle becomes spiral at A; in the middle of this spiral is a minute jet of gas which enters the handle at C, and is supplied from the gas-bracket on the wall. This jet of gas heats the spiral tube, which is of platinum, and the air being driven through it by the bellows is heated sufficiently to retain its heat until it is discharged at the nozzle, four or five inches away from the flame.

The shield B was designed as a protection to the face and lips of the patient, but it is more serviceable as a stand to rest the instrument upon when it is for a moment laid down with the gas still burning in it. The injector is also useful wherever you want unusual dryness, and it has been used to throw remedies in the form of vapor into abscesses.

Dr. Brasseur is the secretary of the French Odontological Society, and a little time since wrote this book, "Studies in Dental Surgery and Applications of the Polyscope and Galvanoscope in Affections of the Teeth and to General Surgery." That was intended also as an elucidation of the electric cautery got up by a gentleman named Trouvé, who has given much attention to electricity. He has invented motors

with which he runs a boat, and has devised an apparatus by which we may illuminate the mouth. Practically, however, this last is but a scientific toy, as yet. It cannot be used in the mouth any length of time, for the platinum wire becomes heated, and after four or five minutes is too hot for comfort; but it is, perhaps, good as a detector of dead pulps. The apparatus has one advantage that I consider very great, for many cases of pyorrhea alveolaris brought to our hands with hypertrophied gums. The little wires of the galvano-cautery can be touched to these gums, and, to use the expressive terms of Dr. DuBouchet, they are melted right away. It works admirably and with very little pain. There has been some effort made to apply this cautery in extirpating the dental pulp; whether that has been successful or not, I cannot say,—that is, sufficiently successful, in view of the pain it gives, to make it practicable.

Among other little objects that attracted my attention was a device for setting pivot-teeth. It consists of a platinum tube, roughened on the outside, designed to be set into a root with amalgam. The tube is grooved or cannulated on the inside, and the pivot is cannulated to correspond, so that it won't turn after insertion, but can be moved one degree to right or left as it is put in. A plate-tooth can then be attached in the manner with which we are all familiar, by backing with gold or platinum and then soldering to the pivot. [The pivot and the tube which it fits, tied together, were passed around for inspection.]

Dr. DuBouchet is quite an advocate of the electric light and the cautery. In endeavoring to use the saliva pump or ejector manufactured by the Buffalo company, I think he found that it did not always respond. Unable to get just what he wanted on that side of the water, he applied to the gentleman who manufactured this hot-air apparatus, and the result was an ejector in the form of an hour-glass suspended by the middle. As the water runs from the top bulb of the hour-glass into the bottom, a vacuum is created. When the water is all out it can be turned over to allow the water to go back again and you have then a constant suction as long as the instrument continues to be reversed.

Dr. Perry. Do you consider that ejector superior to the one attached to the wall?

Dr. Bogue. I don't know that it is superior to the Buffalo ejector, but this one also is attached to the wall.

Dr. Perry. Is it superior to the one attached to running water?

Dr. Bogue. The two are entirely unlike. The one attached to the running water is an American device; they don't have running water on the other side much; they have to content themselves with a pitcherful: and it is rather an expensive and large thing to attach

here. The ejector I speak of is to be used where you have not running water. A little further along in time I saw a petroleum lamp with reflector and chimney, argand burner and tube, so concentrating the light that it was stronger by considerable than the water-globe which I had used for some years, though not giving so white a light. The same gentleman who devised that lamp also devised a hydraulic press for swaging plates; that to my mind is one of the most marvelous things that I have seen in the dental laboratory. I have a print of the apparatus in my hand. The press is about two feet six inches in length, perhaps a foot wide, with a handle like a pump. The stream of water which is thrown from the little reservoir is as big as a knitting-needle. At the top of the cylinder into which the water is thrown is a diaphragm of rubber made like a fez, or like a section of a stove-pipe with an end over it. Underneath this rubber comes the stream of water. An impression being taken of the mouth that we wish to fit, Spence's metal is poured directly into the impression and forms the swage. The swage is placed in that shape in the press; the gold plate is put underneath it and on top of the rubber diaphragm, the whole is clamped in position, and the water pumped on. It is taken out a couple of times to anneal it. When the indicator shows a pressure of about three thousand pounds, you wait a moment and the plate is then removed, and such an adaptation is found of plate to swage as I had never seen or dreamed of. It seems absolutely perfect. Dr. Brasseur says that the suction is fully equal to anything he has ever seen in rubber or celluloid. The oscillation which is so generally found when we undertake to swage a plate by pounding is totally absent.

This apparatus was exhibited in London during the meeting of the Medical Congress. Some French dentists, Drs. Poinsot and Saussine, seeing it, conceived the idea that it could be improved upon. They took an ordinary hydraulic press of about the same size as the one described and adapted a heavy cylinder to it, in which the swages could be cast. The power of this press is such as to bend perceptibly an oak beam two feet long and ten inches square.

The swage or die was designed to be made of Spence's metal as in the Telschow press, but the counter-die was to be made of D'Arcy's or Wood's metal, either of which melts at so low a degree that after the plate has come out of the press, if it remains in the female portion of the die, this portion can be melted over a gas-jet and the plate be picked out just as liquefaction commences.

Whether, all things considered, this process has any advantages over the Telschow process remains to be seen. The advantages hoped for are, first, a cheaper apparatus, and secondly, a more perfect adaptation in irregularly shaped cases, especially overhanging

margins of alveolus. This effort at improvement shows the wide awake condition of our brethren over the water.

When the Spence's metal die has been made, it will be borne in mind that that is the only cast of the mouth that comes from the impression. When they wanted another on which to shape their gold plate with a horn hammer I saw them take a handful of the clay of which sculptors make their first models, and put it down over the cast for an impression and take it off. Right into that they poured another swage of Wood's metal. In a couple of minutes it was cold and ready to pound the plate on with the horn hammer. This gave it a certain degree of form ready to put into the hydraulic press, and saved some time there. The whole thing was done with such rapidity as to startle a man who don't know much about plate-work in France. From the impression to the swaged plate, one that I saw took thirty-five or forty minutes. I never before saw any such plate-work as that done, and the fit was beyond all praise.

While in Dr. Poinsot's office I was shown the operating-room, and a number of things which he had there; among them was another hydraulic machine, with a copper tube leading from the force-pump less than the size of my pencil, with which he opened and syringed out abscesses over dead teeth and cases of pyorrhea alveolaris to his heart's content, using this water very much as the miners out West do; he threw a small stream on to my hand, and I did not stay there more than two or three seconds; it hurt as though the flesh were being penetrated, the force was so great. What the final results of that sort of treatment will prove to be, time alone will show, I suppose.

This gentleman, Dr. Poinsot, showed a degree of information that surprised and gratified me. He is one of the instructors of the dental college which is already established and under way. This college was established mainly by the workmen. The dentists there are divided more sharply than they are here, into proprietors and workmen. Among the proprietors are many medical men; the workmen are expected to stay workmen all the way through. Every now and then some of them won't do it, and become proprietors and engage workmen; that makes dentists of them. The idea of dental colleges has been mooted for some time. At last, finding that the medical men did not stir, the workmen got together and organized a college, and for an institution formed in that way, without previous experience, and with such knowledge as could be got from books and conversation, they seem to have done a very creditable thing. The medical men of the profession are still seeking to organize a school on a higher basis. They are striving to get the legal recognition which is accorded to the medical school. Just now they are disturbed be-

cause the medical men have brought in a project for the purpose of regulating by law the practice of dentistry, but the regulations which they propose would be impracticable, as they would cut off all foreigners wishing to practice in France quite as effectually as the English law does, and that is exactly what the best men don't want to do. They say that we learn from one another. In the practical part, if not in the theoretical, there has been much learned already from the Americans, and they are quite willing to learn more. So until the medical men practicing dentistry and the medical men practicing medicine can come to some agreement, it does not look as if much progress can be made in the establishment of the school or the placing of dental practice under the proper kind of government with the protection of law. They may come to terms speedily, or it may be long delayed.

I found in Dr. Poinsot's office, also, another hot-air instrument which works upon the principle of the platinum cautery. I suppose most of the gentlemen present know about that. The platinum wire is heated to redness, and a current of air saturated with the vapor of naphtha is thrown upon this red-hot platinum. So long as the current is continued the platinum stays hot, and it may be brought to a white heat by increasing the force of the current. That has been used among surgeons as a cautery for some time. Dr. Poinsot adopted and adapted it to the use of dentists.

To return once more to the office of Dr. Brasseur, who is entirely on the other side of the fence from Dr. Poinsot. I was taken to his laboratory, and after showing me the operation of the hydraulic press, he showed me the operations of his celluloid injector. If the promise of those two instruments is fulfilled, and if what celluloid workmen have said to me proves not to be a mistake of theirs, it seems to me that we may look forward to a gold plate with celluloid attachments of plain teeth as one of the most complete artificial dentures that can he made. I have been told that celluloid, if allowed to stand a good many years, until it has lost all trace of camphor, retains its color and polish, and is much more durable in the mouth.

Leaving Dr. Brasseur's laboratory and going into the office, I was shown a number of casts taken of sets of teeth that had come under his observation; they reminded one very much of cuts we see in Fox, where we see teeth filed to the saw-edge. Those were the work of some American, I believe. He opened a drawer and handed out a dozen forceps, all of which immediately separated and were adapted to one another. Any two pairs could be put together indiscriminately; one side had a shape adapted to the other, the other side had a plugger in it. We are all familiar with plugging-forceps.

This form was a curious modification of a plugging-forceps by a brother practitioner named Gaillard. In addition to these plugging-forceps he had an instrument which looked like a button, made of hard rubber, with a plugger upon the one side. The flat rubber cushion is put into the mouth, and the patient is to be directed to bite and do his own plugging. A little deeper in the operating-case we came to a number of sets of artificial teeth. Among the number were natural teeth mounted upon celluloid plates, with a perfection of arrangement and appearance that you can imagine. In the course of conversation with these gentlemen about artificial work, a mode of making rubber plates was mentioned. If one were going to insert a partial set, the impression having been taken, it would be passed over to the workman, who makes the cast, and if the teeth above and below show wear, it is a very easy thing to get an articulation; if they do not show wear, or any such formation as to enable one to get the articulation perfectly, then, of course, there is nothing for it but to take the bite. The bite is taken in wax, the two casts are put together with the help of that wax, and the plate is then got up in the usual manner, but instead of being vulcanized on the model it is taken off and vulcanized like a repair piece, and sent back on the articulating-model, so that the workman has the guarantee that if the plate fits the cast, no fault can be found with him, and the dentist has the guarantee that the plate is right if his impression is right.

One point that came up has been controverted four or five times by some of their men with whom I have spoken. I was especially requested in taking impressions to let my impression alone after I had taken it out of the mouth. Some people undertake after an impression has dragged to bend the impression back again so that it shall not show the drag; others undertake to carve the teeth so as to get rid of the dragging as the composition leaves the mouth, all of which is useless. I was told to take my impression out as straight and as carefully as possible, give it to the workman, and if the plate is adapted to that cast, it will come out exactly as the impression came out, drag included. I found it did, and I found the time necessary to do my plate-work was diminished fully three-quarters, for when the workmen did their work with accuracy, and they generally did, my own attention was scarcely required for more than the impression, the certification that the articulation and arrangement were correct, and the insertion, which often took only a few minutes. In finishing up those plates I saw such accuracy that the rugæ were nicely hand-carved and the plates polished. On one occasion I was in a little bit of a strait, and I asked a gentleman living near me if he would help me out, as the patient had to leave the city within forty-eight

hours, and I was not able to get through what was wanted, as my impression had just been taken. The gentleman, who kindly helped me do the work, completed the gold plate inside of twenty-four hours, ground the teeth on, made a little gold saddle as a plate across the mouth, leaving the lingual portion of the incisors entirely free and clear of the plate. He covered that plate with pink rubber on the lingual side, which made it almost invisible when madame had her mouth open to sing. When the lady came for the teeth the thing was so accurately adapted as to require scarcely any touching; the whole time the lady was in the office, when she came for the plate, did not exceed twelve minutes.

Another feature I noticed there was the use of white rubber for biting-points, and also between the teeth, where we put pink. I was not at all prepared for the effect. It turned out to be very good; there is less to notice when white rubber is used than when the pink rubber is there.

They find a great deal of fault with our teeth; while the form and arrangement of the blocks are better, they prefer above all single teeth, and use a great many English teeth. The American teeth are made with flat backs; English teeth are made somewhat more cylindrical. I cannot say that I have found Dr. Kingsley's nice anatomical arrangement,—I don't think that is to be found very often anywhere,—but aside from those particular curves which he so justly and accurately advocates, I found the other arrangement to be very admirable, and their better men certainly put in artificial teeth that would defy detection quite as well as any that I have seen here.

I found that red gold, which is much stiffer, is used for plates instead of our silver-alloyed gold. I also saw in the laboratories a curious shape of work-bench. I don't know but it exists here; it was as though a section were cut right out of the table here, and the workman sits in the middle with his tools on either side of him; it is a very convenient arrangement. Instead of charcoal or pumice-stone I saw a bundle of wire with a handle; large wires ran up a couple of inches or three above the handle, then wire thread was wound around and around; of course, this bed of wire was heated with the flame, and it retained the heat much better than the charcoal could. I think that this is an old device, however.

On reaching home I found this articulator from Dr. Oehlecker, of Hamburg, who requested me to exhibit it to this society. This carries out largely the ideas that I have been trying to give of the workmen who undertake to work accurately from models given them. It will be seen what this is by inspection. [Dr. Bogue exhibits and describes the articulator.]

In regard to operations in the mouth I am not able to say much. Those who were kind enough to show me their laboratories did it, I think, because I was an American. Most of them, I am told, are very chary of opening their laboratories. I saw in Dr. Brasseur's office some gold fillings put in with No. 12 foil. Certainly the fillings which I saw in the teeth lying in the drawer were very handsome; I don't know anything about the filling in the mouth. The most of the better men there have operators who do their operating; they making plate-work their specialty. It is perfectly true that dental surgery, as such, is very little practiced on that side of the water as it is here; the business which a dentist most looks for, which is most remunerative, and which goes with the office when the office is sold out, is artificial work, and it is a calamity to them that rubber has been introduced. Previous to the introduction of rubber most of the artificial teeth were made of hippopotamus ivory, and those plates would last for two or three years, perhaps five. Casts were always kept, and once in about so long another set of teeth would be set going. Once a practice was established, it was never-ending, like a grocery. Patients came back once in so long for another set of teeth; these workmen complained that their business has been spoiled by the introduction of rubber.

Perhaps I may venture, as I am standing now before you, to speak a word or two about the Chambre Syndicale, as they call it; all the trades have huge trades-unions, and they hold regular stated meetings either monthly or otherwise, always in the same building; hat-makers, paper-makers, and printers, etc. Dentists come under the same category; this syndicate has a great deal of power; anything that has the name Chambre Syndicale is listened to very respectfully by the minister; whereas you get five thousand names attached to a petition and go to this same minister, and he will show you the door,—very politely, of course. So the dentists have formed themselves into a society; they hold their monthly meetings and discuss subjects; most of the time so far the subjects discussed have been constitution and by-laws, or college, or some change in the constitution.

Dr. F. Y. Clark. How do the dental fees compare with the fees in this country? Do they work by the hour there?

Dr. Bogue. I don't think so. I think the fee generally is twenty francs for a visit, a consultation. I go into your office and ask for a consultation, and I pay my twenty francs and get an examination; the next time I go you treat the tooth,—twenty francs more. The next time you put a little amalgam in, twenty francs again, and if the roots are to be cleaned, and they rarely are, perhaps you do it again, another twenty francs. Then I go away and am gone eigh-

teen months and come back again with a tremendous abscess. You pull out the tooth, clean out the roots, and set it back again, and you get your twenty francs again. It is to be understood that the rank and file there and the rank and file here may do such things as that for aught you know; but I do say, that among the gentlemen with whom I have been thrown in contact, I have been surprised at the knowledge exhibited, at the manipulative skill displayed, at the patience, at the results accomplished in artificial work, and although I have not seen much of operative work, I should think from conversations I have had with them relative to operative dentistry that such men would rank well anywhere. I don't mean, by any means, to intimate that they would do what some gentlemen on this side of the water do in the matter of gold filling; neither do I mean to say that they would save as many teeth as we do,—I don't think it at all.

You ask about the fee. I suppose the fee in England is a guinea, I suppose the fee in France is twenty francs. I believe just as thoroughly to-day as ever, that any man who deals both honestly and successfully in our calling, will have his efforts recognized all they ought to be, in Europe, as well as here. I don't think any half-hearted way will meet with anything more than half-hearted recognition, nor ought to. One of the greatest difficulties we have to contend against is with the custom of a fixed fee; and as Mr. Tomes, Sr., told me, years and years ago, it was almost impossible to get over that thing in England, certainly for an Englishman, and furthermore he admitted that running with the current was far more profitable and far more easy. It would be asking a great deal of the whole profession of British dentists or Continental dentists to change their mode of practice to adapt themselves to our way of doing it.

Dr. Dexter. I should like to ask Dr. Bogue with regard to the use of Spence's metal; is it used in the counter-die or the die itself?

Dr. Bogue. The die itself. I am told that a deft hand can pour it directly into the impression. I did not see that done.

Dr. Dexter. I attempted to do it, but was not successful. If you get it too hot it will thicken. You have to get it to just such a temperature in order to have it thin enough. I found it so brittle that I could not use it; possibly it might be used to advantage in the place you spoke of.

Dr. Bogue. Not possibly, but surely, for I saw it. As I stated, this metal is fragile like glass, and very hard, and as the doctor suggested, it would break immediately with a blow.

Dr. Dexter. It takes a beautiful impression. I have used it to take impressions for lithographing.

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

At a meeting of the First District Dental Society, held January 2, 1883, Dr. James E. Dexter read the first part of his paper on "Artificial Crowns." *

Discussion.

Dr. William H. Dwinelle. I perceive that the reader of the excellent paper we have heard to-night, has given to me the credit of being the first to place a band or ferrule around a root for the purpose of shaping and retaining an artificial crown. Of course, as a first effort, this was crude. However, it is one of the many things we do which are never performed twice alike, and in which improvement constantly occurs. But the illustration shows the original of all the subsequent forms of bands or ferrules for artificial crowns. It is, of course, subject to numberless modifications, and many such have been made and claimed as original inventions.

Dr. William H. Atkinson. I will state a method I have used to form an artificial crown. I molded very thin platinum plate around a solitary bicuspid, to the exact contour of that tooth. I then cut a narrow section from one side, in order to slightly reduce its diameter, and after bringing the new edges together, flowed gold scrap into the platinum shaped to form the crown, leaving sufficient free band at the cervical margin to clasp the periphery of the bicuspid root it was to be mounted upon, and also flowing the gold around a projecting screw for the root. In subsequent similar operations I have substituted the plastic cements for the gold.

Dr. William T. LaRoche. I would ask Dr. Dwinelle if he considers that the band or ferrule thrown around a root will preserve the root. I have seen several such cases, and my experience of them is that the roots under the bands depreciate and cause trouble.

Dr. Dwinelle. If the band is so fitted as to leave a pocket or space anywhere between itself and the root, foreign substances will lodge therein and cause pericemental trouble. But if the band be so placed as to cover and grasp the cementum, and to fit it tightly, no trouble need be anticipated. If dentine is laid bare in fitting, and left exposed, decay will ensue at that point; but cementum never decays. I have seen such cases as Dr. LaRoche describes. To prevent their occurrence, the band should grasp the cementum, to which it should be tightly burnished, and should not be forced on so far as to irritate the pericementum.

At the meeting of February 6th, the reading of Dr. Dexter's paper on "Artificial Crowns" was concluded.†

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* See Dental Cosmos, April and May, 1883.

† See Dental Cosmos, current number.

Discussion.

Dr. N. W. Kingsley. I am constantly reminded of the absurdity of claims which are as constantly being made for originality of invention in dental operations and apparatus. Dr. Dexter has shown us a bridge of Fauchard's made one hundred and fifty years ago. The piece is identical with one I made in January, 1858. I also had two lateral roots on which to pivot the piece. I inserted cedar-wood plugs in the roots, bored these out to receive the gold pivots, and drove the piece to place with a mallet. Three years afterward the piece was doing good service. I have not seen it since.

Many of the operations Dr. Dexter has recorded are, doubtless, very beautiful, ingenious, and skillful. But experience forces me to the conclusion that they are more beautiful on paper than in the mouth. I am strongly inclined to think that nine out of ten dentists who shall essay some of these elegant operations will discover a remarkable difference between their description and their practical application.

A member. When in London I was shown a bridging operation. The piece included four teeth, from the right central to the first molar. It appeared very cleanly, and seemed in good condition. It had been in use two years, and the wearer was much pleased with it.

Dr. J. B. Littig. I am opposed to permanent bridge-work, both from experience and on principle. I do not believe it is practicable to make two or three roots do the work of from six to a dozen teeth; nor do I believe it possible to insure perfect cleanliness in such cases. Only a short time ago I was called upon to remove a specimen of bridge-work from the mouth of a patient of some who specialize that operation. The irritation and inflammation produced by the appliance around the roots was very great, and the odor from its uncleanliness was unbearable to the patient. She had applied to those who inserted it to have it removed, but was told that as it answered every purpose it ought to remain, and that it could not be removed in any event. I soon cut it off. I understand that the patient recovered her money from the operators.

Dr. E. A. Bogue. Dr. Dexter has carefully gone over the various methods of artificial crowning. Is it his opinion that this bridge-work (of which we are hearing so much nowadays) is work that ought not to be done—work that has been tried again and again, and abandoned?

Dr. Dexter. That is my opinion. I do not think that a permanently fixed bridge should be placed in the mouth, and my researches guarantee the belief that the general profession has been of the same opinion for the last one hundred and fifty years.

Dr. Bogue. I have seen many cases of this operation, and cannot imagine a more offensive and hurtful method of artificial substitution.

JAMES E. DEXTER, *Secretary.*

THE First District Dental Society of the State of New York held its fourteenth annual meeting on Tuesday, April 3, 1883. The following officers were elected: A. L. Northrop, D.D.S., president; Frank Abbott, M.D., vice-president; James E. Dexter, M.D.S., secretary; Charles Miller, M.D.S., treasurer; J. F. P. Hodson, D.D.S., librarian; A. L. Northrop, D.D.S., C. A. Woodward, D.D.S., W. A. Bronson, M.D., E. A. Bogue, M.D., Frank Abbott, M.D., board of censors; James E. Dexter, M.D.S., C. A. Woodward, D.D.S., J. F. P. Hodson, D.D.S., executive committee; C. F. W. Bödecker, D.D.S., F. H. Lee, D.D.S., W. W. Walker, D.D.S., clinic committee.

JAMES E. DEXTER, *Secretary.*

MEETING OF DENTISTS IN ST. PETERSBURG.

A MEETING of a number of the oldest-established and best-known dentists of St. Petersburg, Russia, was held at the Grand Hotel, in that city, on the 13th of April, 1883, to take into consideration the best means of elevating the practice and advancing the interests of the profession. It was resolved that, to attain the end sought, it would be necessary to address a petition to his Excellency the Minister of the Interior, asking permission to form a society of dentists on the principles that govern medical societies, so that they could meet and discuss subjects pertaining to their art, and adopt rules that would place the profession on a scientific and honorable footing. The resolution was unanimously adopted.

SOUTHERN DENTAL ASSOCIATION—GEORGIA STATE DENTAL SOCIETY.

THE Southern Dental Association will hold its annual meeting in Atlanta, Ga., commencing Tuesday, July 31, 1883.

The Georgia State Dental Society will meet at the same place on the day previous, Monday, July 30, 1883.

This change in the time of meeting has been made to accommodate those who wish to attend both the Southern and American Dental Association meetings. The American Dental Association will meet at Niagara Falls, August 7, 1883.

INDIANA STATE DENTAL ASSOCIATION.

The Indiana State Dental Association will meet at the Dennison House, Indianapolis, Ind., on Tuesday, June 26, 1883. This is the quarter-centennial meeting of the association, and will be made specially interesting by reminiscences from members, by clinics demonstrating the use of gold and plastic filling-materials, and will close with a jubilee and banquet. The subjects for discussion will be those of its first meeting. Arrangements have been made by which those attending the meeting will be accommodated at the Dennison House at $2.50 per day. An invitation is extended to dentists, manufacturers, and dealers to attend and make exhibits.

J. E. Cravens, *President*,
Indianapolis.

NORTH CAROLINA STATE DENTAL ASSOCIATION.

The North Carolina State Dental Association will hold its ninth annual meeting at Morehead City, N. C., commencing Tuesday, June 12, 1883. The dental profession is cordially invited to attend.

W. H. Hoffman, *Secretary*,
Charlotte, N. C.

NEW HAMPSHIRE DENTAL SOCIETY.

The sixth annual meeting of the New Hampshire Dental Society will be held at Phenix Hotel, Concord, Tuesday, June 19, 1883, at 11 o'clock A.M.; continuing during day and evening.

The Board of Censors will meet for the examination of candidates for licenses at Phenix Hotel, Monday evening, June 18th, at 7.30 o'clock.

Dentists of the State are cordially invited to be present at the meeting. Railroad fare half rate.

E. B. Davis, *Secretary*,
Concord, N. H.

PENNSYLVANIA STATE BOARD OF DENTAL EXAMINERS.

The Pennsylvania State Board of Examiners will hold meetings, as usual, during the session of the State dental society, commencing Tuesday, July 31, 1883, and continuing three days, at Cresson, Cambria County, Pennsylvania. Applicants for certificates will be required to show specimens of work in both operative and mechanical departments.

W. E. Magill, *Chairman*,
932 Peach St., Erie, Pa.

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Some of the Opportunities, Responsibilities, and Encouragements of Life. An Address delivered before the Massachusetts Dental Society, at its eighteenth annual meeting, in Boston, December 14, 1882. By C. A. Brackett, D.M.D., of Newport, R. I. Boston: Wright & Potter Printing Co., 1883.

OBITUARY.

DR. EDWARD VANDERSLICE.

Died, in Philadelphia, May 7, 1883, of rheumatic gout, Dr. Edward Vanderslice, in the seventy-sixth year of his age.

The illness of Dr. Vanderslice extended over several months. He was born in Philadelphia, July 19, 1807, being at the time of his decease about the oldest dentist in the city, where he had been in practice for upwards of fifty years. In early life he attended two courses of lectures at the Jefferson Medical College, and subsequently studied dentistry with his brother, Dr. Thomas Vanderslice, who was a graduate of Jefferson College and a dentist. The subject of this notice was among the first to practice the filling of root-canals. For several recent years he resided in Germantown. He was a competent dentist of the old school and an honorable man. His remains were taken to Reading for interment.

DR. WILLIAM A. CORNELIUS.

Dr. William A. Cornelius died in St. Louis, Mo., on the 4th of March, 1883. At a meeting of the St. Louis Dental Society, of which he was one of the oldest members, held May 1, resolutions were adopted characterizing him as "a man eminent for his sterling worth, integrity, and energy, a worthy member of the dental profession and good citizen," and tendering the sympathies of the society to the bereaved family.

DR. WALTER C. HOGAN.

We have intelligence of the death of Walter C. Hogan, D.D.S., which occurred recently, from consumption, at Stockton, Cal. Dr. Hogan was a graduate of the Pennsylvania College of Dental Surgery, at its commencement held in March last. He was a young man of much promise, and was highly esteemed.

DR. ALEXANDER DIENST.

At a special meeting of the St. Louis Dental Society, held on May 5, 1883, action was taken in reference to the death of Dr. Alexander Dienst, one of its members. Resolutions, reported by a committee consisting of Drs. M. C. McNamara, William F. Hermann, and James W. Whipple, were passed expressive of regret at the untimely decease of Dr. Dienst, in whom the profession had "lost a bright example, a wise counselor, and a true friend, and the public the services of a worthy and skillful dentist." Sympathy was tendered the family in their bereavement, and the society resolved to attend the funeral of the deceased in a body.

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

I have seen a great many explanations in regard to gold fillings turning black, but none that seemed to apply to a case of mine. During the years 1880-81 I filled thirty-two cavities with gold for one of my patients, and among the first was a small filling on the labial surface of the left superior lateral, about a line from the gum. In a short time that filling was black. I cleaned and burnished; then cleaned with pumice flour and left without burnishing; but each time it was as dark as ever. Then I refilled, and finished the same as before, but with no better result. I used the same gold for all the fillings. The rest are all as bright as ever. Will some one please give me an explanation?—F. A. G.

I hear occasionally of dentists having trouble in the breakage of sectional teeth. I had considerable bad luck years ago in that way, and came to the conclusion that my flasks had seen too much wear and tear from rust and otherwise. I laid them away and bought some of brass of the Whitney patterns, well fitted, and I have had no trouble since in that direction.—A. G. N.

Scientific Hand-Excavators.—The ordinary hand-excavators have two principal defects,—the loss of force in using them, and the variation in the working of different instruments,—in some the waste of force amounting to ninety per cent.

of that exerted. The difference between about eighty-eight and ten is the range of variation in the working of different instruments. Every instrument requires a special amount of force, and hardly two are found in the same set that work alike, or would work alike, aside from the variation caused by the extent and shape of the cutting-edge. Among those in which the least power is lost, the variation in working is not so appreciable, and practically amounts to very little; but in those where the loss is greater, the variation in working, to say nothing of the actual loss, becomes a serious matter to the operator.

FIG. 1.

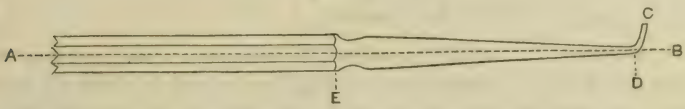

Fig. 1 represents the general features of the common form of hand-excavator; C, the cutting-edge; E, D, the shank; A, B, the line of the long axis of the handle. When such an excavator is used considerable force (of which all is wasted) must be exerted to prevent its turning on the line of the long axis of the handle, and when the operator wishes to cut by turning or rotating it a slightly greater force must be exerted, of which about eight-ninths (if the cutting-edge is of extreme distance from the line A, B, Fig. 1) will be wasted. The loss of power through the tendency to rotation is dependent upon the distance of the cutting-edge perpendicularly from the line of the long axis of the handle, *i. e.*, the tendency to turn over. About ninety-five per cent. of the entire force lost in the use of excavators in which the cutting-edge is of extreme distance from the line A, B, Fig. 1, is wasted through rotation. The only variable part in a given set of excavators, aside from the shape and extent of the cutting-edge, is the part C, D, Fig. 1, and the essential portion of that part is the cutting-edge. It follows that the variation in the working of different excavators of the same set, aside from that caused by the extent and shape of the cutting-edge, and the bulk of the loss of power attendant on their use, is dependent upon the position and length of the part, C, D, Fig. 1. Give that part, or rather its essential portion, the cutting-edge, the same position in relation to the handle in every instrument of a given set, and every instrument of that set will work alike, aside from the variation caused by the extent and shape of the cutting-edge.

FIG. 2.

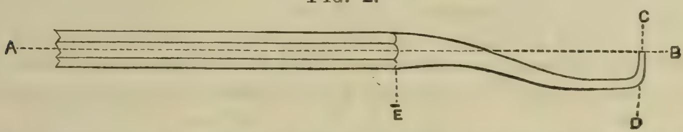

Fig. 2 represents an excavator in which the cutting-edge, C, is given a special position; the shank, E, D, being formed to that end. The cutting-edge is upon the line of the long axis of the handle, A, B. But what good will result from it? There will be the least possible variation in the working of the different instruments of the same set; the loss of power if this form is combined with a short shank will be reduced to the minimum amount; the instrument will have no tendency to turn on the line of the long axis of the handle. Turning or rotating the instrument will accomplish nothing, for the cutting-edge is virtually a pivot, and all cutting must be done by side, or pull, or push motion, unless the angle at D rests upon some adjacent solid. Doing away with rotation does away

with the motion in which the greatest amount of force is wasted. Instead of the cutting-edge, the angle at D will vary in relative position to the handle, and it has nothing to do with the working of the excavator herein illustrated, unless it rests upon some adjacent solid. The amount of force necessary to work the common excavator will be reduced by over one-half. This is no exaggeration of what can be realized from excavators formed on the principles illustrated in Fig. 2. Every excavator can readily be formed after this plan; and every part operated upon with common excavators can be reached by one of this form having the part, E, D, properly shaped.—Charles T. Howard, D.D.S.

To the Editor of the Dental Cosmos:

I have just written a criticism upon the proceedings of a leading dental society, and also a few words on other points, naming the journal in which all appeared, the society, its president, etc. Upon reflection I will let the criticism stand, and those who care to take the trouble may find out for themselves when and where the reports were published, and who participated in the proceedings.

The subject before the society was one discussed in nearly every number of every dental journal the year round. The president opened the discussion with extended remarks on the ordinary mode of treatment, in substantially the same words that we have seen so many times since first reading a text-book on dental surgery. He did not evolve a new idea. When he had finished, the members rose, one after another, and talked substantially in the same strain, with only a slight variation in their individual practice, the remarks of each being threadbare from years of repetition. Finally the exceedingly dignified and respectable society adjourned, having gone over the programme as seriously and deliberately as if they were really doing something very creditable to themselves and beneficial to all who were so fortunate as to read the published report of their proceedings. Now, there was no irreparable harm done, I must admit, and we will not deny them and others the privilege of thus expressing themselves; but cannot there be a way devised to relieve the busy, hard-worked practitioner, who has read these things already many hundred times, from being trapped into the same dreary labor for all the rest of his life, without running the risk of losing what few new ideas may unexpectedly and at long intervals be buried in these masses of rubbish? Cannot the editor mark such reports or articles somehow so that they may be detected at a glance, as being only the two hundreth repetition of the same old story? Or, why not devote a few pages next to the advertisements, giving the substance of these "discussions," leaving blanks at convenient distances for inserting each month the name of societies, presidents, members, etc., thus saving much waste of type-setting. The reader could go over them every month or not, according to his individual taste, as he would in time learn how much good it did him.

Another criticism was this: In the same journal was printed the report of the proceedings of a society held just thirteen months previously, which also contained the discussion upon an essay which was published six months before in this same journal. It may be that the publication was made too soon even at thirteen and six months' delay,—so soon that some were unnecessarily bored with their ceaseless repetitions,—yet, if they were worth publishing at all, I submit that in this age one month is sufficient, when the newspapers want only one hour to one day to place all of value before the reading public. Can we have a change in these things, or must the present order go on forever?—W. E. Driscoll, Bedford, Indiana.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

THE AGENCY OF ACIDS IN THE PRODUCTION OF CARIES OF THE HUMAN TEETH, WITH COMPARATIVE ANALYSIS OF CARIOUS DENTINE AND DENTINE SOFTENED BY ACIDS.

BY W. D. MILLER, BERLIN.

I. Introduction.

The facts that microscopic preparations of carious dentine almost invariably show considerable portions of softened dentine which are free from micro-organisms; that micro-organisms, when present, do not appear to encroach upon the basis-substance till the later stages of the carious process; that on the border between softened and normal dentine it is easy enough to obtain tissue entirely free from organisms; that ground sections of carious teeth usually show a zone of softened, non-infected dentine between the infected and the normal dentine; that the powder to which enamel is reduced by caries proceeding upon its inner surface is in the deeper layers almost absolutely free from organisms; that the softening of the dentine proceeds with about equal rapidity in all directions, while the infection makes slow progress, except in the direction of the dentinal tubules; that the boundary between the softened and normal dentine may, in most cases, be distinctly marked by proper reagents, while with very few exceptions it would be absolutely impossible to separate the infected from the non-infected dentine; that enamel may be so changed by the process of caries, as to become stained with aniline dyes without showing any invasion of fungi; that pieces of sound dentine may remain in contact with carious dentine for twelve months, at the temperature of the oral cavity and under proper conditions of moisture, without showing any trace of caries; these facts, I say, and others of like nature, suggest the thought that the first stage of caries may have other causes than those of a parasitic nature, and

make us hesitate before we cast up everything in favor of bacteria.*

Among the theories which have at different times been more or less accepted as an explanation of the phenomena of caries of the human teeth, none has occupied a more prominent place than the chemical, and I shall endeavor in this article to show as far as I am able, what value is to be attributed to acids as auxiliary to other agents in the production of caries; being convinced that more than one agent is concerned in the process and that we shall not be able to obtain a just conception of it until we find out and assign to each one its proper value.

For the purpose of demonstrating what acids *may* perform in connection with caries, I introduce the following experiments, which are so simple that any one who doubts their accuracy may easily repeat them for himself.

Let me say first however, once for all, that I am not an advocate of the pure acid theory of caries nor of the pure germ theory; I believe rather that both acids and fungi are concerned in producing caries, that the tendency of late has been to under-estimate the former and over-estimate the latter, and that both together cannot furnish a satisfactory solution of all cases of caries.

Experiment I.—In a very large tooth (say that of a whale) bore two holes 15 mm. deep and 6 mm. in diameter, chew up a small amount of bread and sugar and fill one of the holes; keep the tooth in a perfectly moist chamber (feuchte Kammer) at the temperature of the oral cavity; renew the mixture every ten days; after ten weeks carefully clean out the hole with distilled water (the dentine will be found to be softened to a considerable depth), fill both holes two-thirds full with distilled water and infect the water in both by dipping the point of a needle first into water containing a piece of fresh carious dentine and then into the water in each of the holes, cork the holes and keep the tooth in a moist chamber at the temperature of 37° C. In a few hours the liquid in the hole which had contained the mixture of saliva and bread begins to become cloudy and emit a very bad odor; this continues for ten days or two weeks till all the softened dentine has been consumed, when the water becomes clear and the smell for the most part disappears. The size of the hole will have increased very perceptibly. The water in the second hole remains transparent and emits no bad odor, nor does the hole at all increase in size.

A microscopic examination of the liquids shows a very rapid increase of micro-organisms in the first hole and they are seen to be in

* The experiments upon which these statements are based were described in two papers, in the possession of Dr. W. C. Barrett, awaiting publication.

that state which indicates that an active decomposing process is going on in the substratum.

A marked increase of fungi in the second hole does not take place and they will be seen to be mostly at rest.

Experiment II.—Bind two teeth together with platinum wire in such a manner that they will be separated at the neck by about 2 mm., fill the space with a mixture of saliva with sugar and starch-containing substances, keep the whole in a perfectly moist chamber at the temperature of 37° C., and renew the mixture every five days; in ten weeks a considerable portion of both teeth, on the adjacent surfaces, will have become softened. Place the teeth then in an infected liquid at proper temperature and in a short time the decalcified portions will be destroyed, but no more.

Experiment III.—Decalcify small pieces of dentine in the manner indicated in experiments I. and II., place them in a small vial with a few drops of distilled water, and infect as above. The water soon becomes cloudy and in a few days the pieces of dentine will for the most part have disappeared. Similar pieces of sound dentine, not first softened, placed under the same conditions, leave the substratum unchanged and remain themselves unchanged indefinitely.

Experiment IV.—Place pieces of perfectly sound dentine together with fresh carious dentine in a flask and cover with a few drops of water, add fresh carious dentine every three or four weeks and keep constantly at a temperature of from 35° to 38° C.; the liquid will become opaque and smell exceedingly foul, and a microscopic examination will reveal masses of schizomycetes, surpassing anything ever found about a sound tooth in the human mouth. Examine the pieces of dentine from time to time and they will be found even to the edges and sharp points unchanged. Microscopic sections of these pieces show no structural change of the dentine; occasionally a limited number of cocci or even bacilli may be seen in the tubules, a fact however, which by no means necessarily indicates caries or even a tendency to it. (Experiment IV. was begun on the 19th of May, 1882, and has been kept up ever since.)

The conclusions which may be drawn from these experiments must be plain to every one.

1st. If there is any place in the dental arch where food continually lodges and is allowed to remain, there, sooner or later, a softening or decalcification of the tissue of the tooth must occur, the extent of the softening being without doubt, inversely proportional to the density of the tooth.

2d. The micro-organisms commonly found in the human mouth are capable of readily transforming such softened dentine into substances suitable to their nourishment or, in short, of consuming it,

while they, on the other hand, appear to affect hard dentine very slowly or leave it altogether unchanged.

It is hardly necessary to reiterate the fact to which I have so often called attention before, that conditions similar to those which obtained in the above experiments are continually to be found in the human mouth. I will cite one case which is constantly recurring in practice. I removed yesterday a lump of food about as large as a small pea from between the necks of two bicuspids and placed it upon a piece of blue litmus paper; the paper instantly showed the presence of a tolerably strong acid. The food was subsequently examined and found to consist chiefly of starchy substances with some muscular fibers.

The acid in this case was, I think, unquestionably the same as that which is always developed when saliva and starchy substances are left in contact at the temperature of the oral cavity, and is capable of softening dentine with readiness. The surfaces of the two bicuspids had lost their natural smoothness and could be easily penetrated with a pointed instrument. Both teeth are doomed to decay. This is not an isolated case. It is in fact very seldom, indeed, that an acid reaction does not exist, whenever, in cavities of decay or elsewhere, we find remains of food.

Cases have been reported where a rapid decay of the teeth was not accompanied by a corresponding acid condition of the saliva. This may be so. I am not at present attempting to fix upon acids the first cause of *all* cases of tooth caries. Such reports, however, are very incomplete unless it is stated, 1st, whether the saliva was tested as it entered the mouth or where it was in contact with remains of food; 2d, at what time of day the test was made; 3d, whether the patient had given the teeth a scrupulous cleansing just before coming to the dentist, as many happily do. In order for a test to be perfectly fair it would have to be made in the morning before the teeth are brushed or any food taken. My object is not to attach undue importance to acids. I only wish them to receive the attention they merit.

II. Comparative Analyses of Dentine softened by Caries and by Acids.

Analyses of carious dentine show that a larger percentage of lime-salts is still present in the decaying mass than has generally been suspected; indeed so large has been the proportion in certain cases as to lead to the denial by some experimenters that any such thing as a decalcification at all takes place during the process of caries. If we, however, examine those results more carefully and compare them

with those obtained from the analyses of dentine softened by acids,* (veritably decalcified) we will find I think, nothing which is in any degree, even the slightest, inconsistent with the idea that the softening of dentine by caries is of the nature of a real decalcification.

I have in the last few weeks made a great number of these analyses, determining not only the percentage of lime-salts but in some cases the amount of phosphate and carbonate. Other analyses I have caused to be made by Dr. Paul Jeserich, successor to the celebrated Prof. Sonnenschein and sworn chemist to the royal courts of justice in Prussia. Still others were made under the direction of Prof. Dr. Liebreich, director of the Pharmacological Institute of the University of Berlin. The substantial agreement of the results obtained and the names of Liebreich and Jeserich may be allowed to put the correctness of these results beyond question.

The dentine to be analyzed was obtained in the following manner:

(a) A freshly extracted tooth containing a large amount of softened dentine is thoroughly cleaned from all remains of food or other foreign matter; by means of a spoon-shaped excavator the carious portion is separated around the margin from the sound, and the whole, as nearly as possible, lifted from its bed, dried at 103°–105° C. and analyzed. Often a number of such pieces was used for one analysis. These pieces may be safely said to constitute at least two-thirds of all the softened dentine in the cavity.

(b) Sound teeth were broken up into pieces of various size and these pieces decalcified in a mixture of saliva and bread, kept at 37° C. for six to eight weeks; the softened dentine was then removed and analyzed as above for comparison with (a).

(c) From freshly extracted carious teeth all the softened dentine was removed, quite up to the border of the normal dentine, fine particles were then scraped out by means of a dull spoon-shaped excavator, from six to eight teeth being required to obtain 20 mg. of the material.

(d) Pieces of dentine which had lain for some weeks in saliva and bread were treated as indicated under c, and analyzed for comparison with c.

(e) Sound teeth were coated with wax, which was then removed at the necks of the teeth for a space 3 cm. in diameter, and left for some weeks in the bread mixture, the object being to obtain a softening as nearly as possible like that which takes place in a cavity of decay. The dentine thus softened was scooped out and analyzed. The results were as follows:

The numbers indicate the percentage of lime-salts in the substance analyzed.

	Directed by Liebreich.	Directed by Jeserich.	Directed by Miller.
1. Carious dentine, see (a)	25	24	27
2. Dentine softened in saliva and bread, see (b)	38	40	39
3. Carious dentine bordering on normal dentine, see (c)		56	59
4. Dentine described under (d)		50	56
5. Dentine described under (e)			38

A great many analyses were made of dentine softened in various acids. One analysis of dentine softened in lactic acid gave 29 per cent. of lime-salts; dentine softened in acetic acid still contained 33 per cent. lime-salts, etc., etc. One analysis of a large quantity of carious dentine, by Dr. Jeserich, gave only 19 per cent. of lime-salts, equivalent to a loss of $\frac{10}{11}$ of all the lime-salts originally present. It was thought better, however, to exclude the extreme cases.

In none of these experiments was a quanity less than 20 milligrams made use of and in many the amount was much greater. It was consequently sometimes necessary to bring together the material from a number of different teeth; the results are therefore average results and probably nearer the truth than if obtained from isolated cases. Again, the comparatively large amount of material used in any analysis reduces the necessary errors of experiment to a minimum. With 20 mg. of material to be analyzed and a balance adjustable to tenths of mm. we may reasonably expect to come within two per cent. of the true result. As the amount to be analyzed diminishes, so will the accuracy of the results diminish, until with a quantity reduced to 1 mm. no experimenter, even with *absolutely perfect* manipulation can be sure that the result does not vary 10 per cent. from the true one. But an almost necessary error of 10 per cent. and a probable still greater error is fatal to any analysis. For both these reasons I have continually experimented with larger quantities.

Let us examine these results more closely.

A large piece of carious dentine, such as described under (a) contains about 25 per cent. of lime-salts instead of 72 per cent., the normal amount. Very many at first, no doubt, commit the error of estimating that a reduction from 72 to 25 per cent. indicates that about two-thirds of the lime-salts have been removed. It may easily be shown, however, that this reduction from 72 to 25 per cent. signifies the destruction or removal of no less than seven-eighths of all the lime-salts present.

This on the supposition that the organic matter remains constant.

The actual loss of lime-salts, as I shall show on another occasion is sometimes even greater than seven-eighths of the normal quantity.

If we now compare 1 with 2 we will see that dentine softened by

caries has suffered even a much greater loss of lime-salts than dentine softened in saliva and bread. This difference is undoubtedly due to the fact that in the former case the dentine was much longer exposed to the decalcifying agent than in the latter. The analysis shows, however, very conclusively, that if carious dentine still contains a certain proportion of lime-salts, so also does dentine softened by acids, and I see no reason in the world for affirming decalcification in one case and denying it in the other.

An analysis of the deepest parts of the carious dentine bordering on the normal dentine, gave in one case 56, in another 59 per cent. of lime-salts. The first case indicates a loss of $\frac{364}{720}$ or a little over one-half of all the lime-salts originally present. In the second case the loss is $\frac{317}{720}$ or about three-sevenths.

We see that even the deeper layers of carious dentine have suffered a very considerable loss of inorganic matter.

If we compare these results with those given in the fourth line where the dentine was obtained from the deeper layers of pieces softened in saliva and bread, we see that there is no difference which may not easily be accounted for by the errors of experiment, and particularly by the fact that the layer of dentine taken for analysis does not, in all cases, have exactly the same thickness.

We conclude then from these experiments:

(1) That dentine during the process of caries suffers a very great loss of lime-salts; in fact as great as could be demanded by the most zealous advocate of the chemical theory of decay.

(2) That dentine softened by exposure for some weeks to the action of saliva and bread at the temperature of the human body contains a much larger per cent. of lime-salts than carious dentine, which would, however, probably be reduced to the same level, if the exposure were continued for three or four months.

(3) That even the deeper layers of carious dentine have lost a large proportion of lime-salts. Here the results correspond more nearly with those obtained from the deeper layers of dentine softened by other means; in all probability because the length of time in which the softening agent has been at work is in the cases more nearly equal.

It is not pretended that these results are perfectly accurate. The necessary errors in such experiments are too great to assume any thing of the kind. It is believed, however, that no result can deviate more than 4 per cent. from the true one, and that most of them fall within 2 per cent.

The two propositions which I have endeavored to establish in this article are these:

(A) Acids, especially those generated in the oral cavity by fermen-

tation, are factors which by no means should be overlooked in a discussion of the causes of caries, since by softening the tissue of the tooth they expose it to the action of other agents which follow after, but which do not appear able to attack healthy, normal dentine.

(B) The softening of the dentine produced by caries is a real decalcification, and can in no way and in no degree be accounted for by the action of any agent which attacks *only* the organic matter.

Questions to be determined. What other agents besides acids assist in the process of decalcification?

Do bacteria produce a ferment capable of decalcifying or softening dentine?

I intend in the immediate future a more thorough and scientific consideration of this subject.

THE CAP PLATE: A NEW APPLIANCE IN MECHANICAL DENTISTRY.

BY JAMES E. DEXTER, M.D.S.

(Read before the First District Dental Society, of New York, June 5, 1883.

In my paper on "Artificial Crowns" read before this society, in January and February last, I described a variety of artificial denture commonly known as "bridge-work" or "bridging," detailed some of the objections which plainly and inevitably lie against that kind of apparatus, and briefly mentioned an appliance which I had devised to take the place of permanent bridges and, in some cases, of the ordinary artificial denture. I then promised to bring the new apparatus to your notice when completed; and to-day, through the kindness of the patient, its wearer, who has loaned it to me for that purpose, I am able to keep my promise. Before describing it, I will, if you please, again briefly go over the objections to permanent bridges, and also those against ordinary plate-work in certain cases.

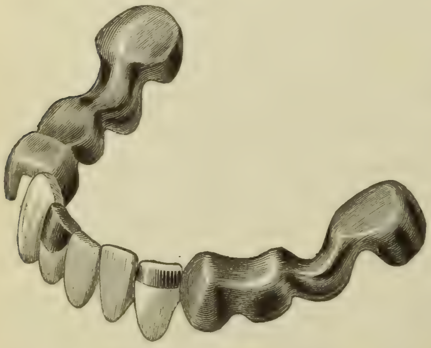
The "bridge," so called, is an appliance only for partial cases, or for cases in which teeth and roots, or roots alone, remain *in situ*. It consists (generally) in capping or banding the remaining natural teeth, and ferruling or pivoting the remaining roots, and to these caps or pivots, or both, attaching bands, bars, or straps of metal which connect in a series all the points of support, and to and upon these bands, bars, or straps fastening the desired artificial substitutes. The whole is then placed in the mouth, and *permanently fixed there*, in several ways. These general principles admit of numberless modifications. Thus, Fauchard, in 1725, carved his denture from hippopotamus tusk, and passed screws through it and into the roots upon which it rested. Register caused the ends of his connecting

bars or straps to project into cavities in the natural teeth, and fastened them there with gold or other filling-material. Low placed bands around remaining natural teeth, and cemented them in place after having soldered his bridge-bars to them. In fact, the *way* was generally suited to the *case.* The main principles of bridging are, broadly, to permanently place artificial teeth between remaining natural teeth and roots in such manner that the porcelain substitutes shall fill the spaces made vacant by nature, while resting upon and being held in place by the natural teeth; the porcelain teeth, in the older methods, resting with more or less pressure upon the gum, and in later methods being raised quite clear of the gum and supported by the natural teeth or roots in the same manner that a bridge-truss or floor rests upon its piers,—hence the name given the operation.

This clearance of the gums has been made a point of first importance in the eulogy of fixed bridges, from the supposed facility for self-cleansing of the apparatus which it affords. But, as a practical fact, permanent bridges are simply the *nastiest* things ever made to do duty as substitutes for nature's work. The spaces between the artificial teeth, crevices under backings, and the spaces under the bands or caps around or over the natural teeth (spaces which it is next to impossible ever to thoroughly and permanently eradicate), simply form a series of invisible and and non-cleansable cesspools in the mouth, for the reception, retention, and chemical disintegration of a continually-renewed mass of débris formed and forced into these places during mastication. No brush, pick, wash, or other agent will practically affect these accumulations to any appreciable extent, or modify their harmful powers. They remain, in defiance of all efforts to the contrary, to taint the breath, to load the inspired air with noxious exhalations which go straight through the lungs to the blood, to impair and even render poisonous the oral secretions which accompany the food to the stomach and thence to the general system, and to make the vaunted "bridge" a source of aversion, disgust, and discomfort, alike to the wearer and his friends. Nor is all this the end of the bad consequences of bridging. The spaces between the caps or ferrules and the natural teeth, through their retention of decaying débris, will almost certainly become, in time, the seats of decay of the natural teeth, with no possibility of even detection (much less arrest) of the lesion until the pangs of tooth-ache or the crumbling of the tooth-wall, followed by the necessary removal and destruction of the whole apparatus (in order to repair damages) have formed for us a very forcible commentary on the "beauties and advantages" (!) of permanent bridge-work. Finally, when we add to these discomforts and dangers the further risk of a (very probable) breakage of some of the porcelain teeth on the bridge, and

the almost absolute impossibility of renewing the broken tooth except at the cost of remaking the entire appliance (for it must generally be destroyed to be removed from its place), I think we may consider that we have made out a very strong case against permanent bridge-work as a practical oral appliance.

Leaving now bridge-work, let me speak of cases in which we could (and often do) wish for some method of inserting artificial substitutes other than ordinary plate-work. Take a case where, on the lower jaw, there are standing in the mouth a third molar, a canine, and first bicuspid, on each side,—six teeth in all. These teeth are shortened, by breakage and mastication, so that the upper incisors close to within an eighth of an inch of the gum line between the canines; added to this, they are so tipped and twisted in their places as to make it very difficult to properly adapt an ordinary denture to the spaces between them; and lastly, let the patient evince entire abhorrence of, and a fixed resolution not to permit, the resting or pressure of any appliance upon his gum-tissue. Such a case is the one for which I have constructed this cap-plate. Such cases are often treated by building up or down the natural teeth with gold, in order to open the bite, and then replacing lost teeth with an ordinary plate. My apparatus, however, accomplishes both these desiderata in one operation, while simultaneously avoiding any and all pressure upon, or irritation of the gum.



The appliance which I now show you (see cut) is constructed as follows: caps of gold-and-platinum alloy, of about 26 to 28 U.S. standard gauge, are struck up to fit over and down the sides of the natural teeth selected for the piers, fitting closely. If all the supporting teeth stand perpendicularly, and parallel with each other, thus creating no "undercut" (so to say), the sides of the caps may encircle the teeth as far as possible, (*not*, however, impinging upon the gum-line), and be simply slit (in two or more places on each tooth) perpendicularly, so as to spring apart and allow of sliding the whole over the natural convexities of the teeth, the sides coming together again when in place and thus holding the whole apparatus firmly. But, should the teeth be tipped or leaning, and not parallel, the sides of the caps must then extend over only such parts as can be closely fitted and yet be sufficiently

perpendicular, and parallel, to allow of removal and replacing of the appliance. Of such a character is the case now shown you, there being only one place on the six caps where a *slit* is of value; the sides of the caps being so fitted as to hold partly by their own elasticity, and partly by that of the whole apparatus. Such a case, of course, will most severely try the capabilities of any artificial denture; and not the least merit of the present piece is its triumph over, and perfect and *practical* adaptation to, the obstacles of an exceptionally difficult case.

The caps, when struck up, will not cling to the teeth when in place; nor should they, for they must be capable of easy removal during succeeding processes. But, when the piece is ready for final insertion, the sides of the caps must be *sprung inward* sufficiently to hold to their supports with firmness.

The caps being now made, it is in order to determine the length of "bite" needed. Place the caps in position in the mouth, and build wax on their grinding surfaces to a proper length and contour, both side and grinding. Invest, remove wax, and flow into its place eighteen carat gold. Shape the grinding surfaces, by trial in an articulator or the mouth, to the proper occlusion. Next, take an impression with the caps in place, pour the model, select and back plain plate-teeth, and wax them in place. Invest the whole, remove the wax from the backs of the teeth, and fit in the spaces between the caps, bands, or bars of irido-platinum alloy (or gold, as circumstances may determine), being careful that the bars fit *accurately* to the *backings* of the porcelain teeth, and to the *caps* at each end. In fitting the bars to the caps, select such points of attachment as will not interfere with the *spring* of the slit sides of the caps. If necessary, let the bars avoid the *sides* of the caps, and reach, by curving, to the *tops* or grinding surfaces. Should you desire to arrange the porcelain teeth irregularly, you need not hesitate to do so. Set them just as you would for rubber or celluloid, and then, simply taking a "finger impression" of their backs with modelling composition or wax, when invested as above stated, and making dies, you can readily "strike up" your bars to fit the irregular positions of the backings. But, should this be difficult, on account of great irregularity, or stiffness of bars, then construct the bars of two or three thicknesses of metal, each struck up separately, and then "sweated" into one. Next, solder the bars to the backed teeth, but *not* to the caps, as yet. The reason is that *perfect* adaptation of the bars to the caps is absolutely necessary to the success of the piece. Therefore, now place the caps in place in the mouth, and wax the bars with their attached teeth in the spaces between them; filing, grinding, and adjusting until all is exactly as required. Then (and

not until then) take an impression of the whole in place, the apparatus coming away with the plaster. Pour the impression with plaster and pumice, sand, or asbestos, (sand is best), carefully remove the impression plaster, invest outside the model with its sustained apparatus, and then solder the caps and bars together. In doing this, as little solder as possible should be used, to prevent warping of the whole. The bars should have a broad, firm hold on the caps; but the contour of their union should be made on the bars *before* they are united to the caps, and *not* by flowing on a body of gold while uniting the bars and caps sufficient to attain the desired hold and shape of union. On the contrary, the bars should be properly shaped at their ends, and carefully fitted to the surfaces to which they will be attached, when a small amount of solder flowed into the joint will make a perfect union and give all the strength possible. This is *not* plumbing work. All that now remains to do is to spring or bend slightly inward, as before directed, the sides of the caps so that they may grasp their supporting teeth firmly, yet not too much so to create difficulty in removal or insertion; then finish and polish. Burnishing is generally objectionable, since it gives, in some lights, a *black shine* to the piece, adding greatly to the prominence of the appliance as a part of the view whenever the wearer opens his mouth.

Should it be desired to produce the best possible results with the piece, the interstices between the artificial teeth and any other crevices to be found may be filled with gold or amalgam,—I prefer the former; or vulcanite may be packed in such places (which may be, if necessary, cut out to proper dimensions by burring), and finished up smoothly. The piece shown you contains no less than *seventeen* gold fillings, which signifies that no débris, or even moisture, has any foothold of concealment about it, and that it is, therefore, as clean in itself as is possible for any artificial denture to be. This, you will say, is rather expensive work. Very true. The whole method is expensive in both money and labor. But I am quite consoled for this fact by the thought that it will not, therefore, be likely to do much harm to the public, since the "cheap-jacks" and "incompetents" will probably let it alone.

In the piece shown there are six caps, three on a side. There are five incisor teeth placed between the canines, two of which are capped with gold to break up the uniformity of porcelain in front, as contrasted with the uniformity of gold behind, and thus help to evade artificiality of appearance. Between the molar caps and the double caps for canine and bicuspid, the connecting-bar is horizontally placed, dipping downward to parallel the gum line, as well as to evade an encroaching molar above. When necessary, an artificial

tooth or teeth can be ground and soldered to these bars. Generally, however, the connecting-bars should be perpendicularly placed, to insure resisting strength in the line of the attacking force.

Various modifications of this process, as regards its uses, will at once suggest themselves. For instance, where a molar or two on one side are missing, they may be thus artificially replaced without a plate, provided there is a supporting tooth or teeth at each end of the space; or the method may be applied to the treatment of irregularity by capping the molars and bicuspids, or molars alone, connecting the caps of each side together, if necessary, by a band or strap directly across the roof of the mouth, or curving around back of the incisors. To these bands or straps, or to the caps themselves, hooks or buttons for attachment of loops, strings, etc., or threaded nuts for use with screws may be soldered. Should it be desired, for instance, to "spread" the bicuspid region, place on each pair of these teeth a cap having a socket formed on its inner aspect, and let the ends of a "Coffin" steel spring rest in these sockets, the force of the spring retaining it in place, and the teeth alone being forced apart without pressure on the gums. This is applicable to a single tooth by making the *opposite* cap inclose teeth enough to resist back pressure. A large proportion of the gum-irritation usual with treatment of irregularity may be avoided by use of the cap-plate instead of ordinary plates.

Should it be desired to use the cap-plate where it is not advisable to open the bite, the caps may be struck and fitted as before directed, and then be *cut through and away only at the points of occlusion*, leaving the balance as before. In doing this, however, be sure to leave enough grinding surface to the caps to securely fasten the spring-sides together.

This method is eminently applicable to cases where *roots only* remain in the mouth,—provided they are sufficient in number and strength to sustain mastication. The variation of the process here required is simple. Pivot or ferrule permanently the roots by any proper process (the Büttner method is the best in this case, because the strongest); but, instead of mounting *porcelain teeth* on the pivots or ferrules, fit thereon *gold piers* or stumps of a proper shape (parallel-sided) to receive the caps; and when all the roots are so mounted, proceed exactly as though the metal piers were so many natural teeth,—capping them as such, (letting the caps assume the form and size of teeth), and fitting connecting-bars and porcelain teeth into the interspaces. Root-cases should be exceptionally favorable ones for this method, since the piers can be placed exactly perpendicular to each other, and be so shaped as to secure for the caps the best of anchorage and bearing.

In short, the adaptations of the new method are many and various; and, since they will suggest themselves, as needed, to the inquiring mind, need not be here amplified. But, should occasion occur, I will advise you of any modifications or applications which may be hereafter made, of sufficient importance to warrant attracting professional attention. In this connection I would ask you to return the favor (if it be such) to me, should any one have used, or be about to use, or require further information upon the cap-plate method.

It will not, I am aware, be at all necessary for me to use the following words of warning to experienced, careful, discreet, and *conscientious* practitioners. But, as this paper will be published, and as the DENTAL COSMOS has a large circulation, I am constrained to say,—in using this process, *be careful of your foundation.* None but perfectly healthy, strong teeth and roots should be selected for this operation; and where such, *and a sufficiency of such*, cannot be obtained, *it should not be performed*. Do not attempt to mount *fourteen teeth on four roots*, or teeth (which, I am sorry to say, I have seen done). Such an operation will, to say the least, lack the necessary element of *permanency.*

Finally, I publish this method to the profession for two reasons. First, I am firmly convinced of the value of the process, and am, therefore, desirous of placing it within the reach of my professional brethren and the public. Second, I desire to prevent, by obtaining a published declaration and record of priority of invention, any imposition upon the profession of a *patent* for any part of the method, which, from credible information, I am apprehensive is now, or soon will be, in train. I have, during some years, been so placed as to have acquired a considerable acquaintance with the published records of the profession. Such knowledge warrants me in believing the method of inserting artificial dentures above described is peculiarly my own invention. As such, I am proud to be able to present it to my professional brethren, without drawback or reserve, for such use as they may choose to make of it.

THE CHEMISTRY OF DECAY.

BY EDWARD S. NILES, D.M.D., BOSTON.

(Read at the union meeting of the Massachusetts and Connecticut Valley Dental Societies, held at Springfield, Mass., June, 1883.

WHATEVER difference of opinion may exist upon the causes, progress, and character of dental caries, there seems to be a general agreement, that the condition which renders decay possible, is a faulty development of structure, and in a general way we recognize

that imperfectly formed enamel and dentine are attributable to non-assimilation of the material required for a typical development of structure. Those strange changes which occur in the progressive development of an embryo tooth are but imperfectly understood. We know that all the complex tissues and organs of man are evolved from a minute mass of colorless matter called bioplasm, in which no apparent indication of structure exists. Its character and composition do not enable us to premise anything as to its formative properties. This primary body of bioplasm absorbs nourishment and grows, divides, and subdivides into numerous masses, which are arranged in definite manner and according to definite fixed laws. The nerve or muscle bioplasm, as far as can be seen, is the exact counterpart of bone, gland, or teeth bioplasm. Why one portion produces one, and another the other tissue, can not be explained. Thus, all the different forms of tissue have been evolved from the parent mass of bioplasm, in prearranged order, and if any tissue has failed to occupy its place in the right period of developmental progress, that tissue will be wanting in that particular organism. If, for instance, the tissue-builders which take part in the formation of a certain portion of dêntine or enamel do not receive at the right time a proper supply of material, a well-developed tooth can not in that case be formed, even though at these special points the formative work may go on subsequently in regular order. That portion where nourishment was withheld will never be able to perfectly perform its function, and the tooth at this point will be unable to resist the destructive agents of decay.

Successive generations of excessive nervous development at the expense of the osseous and muscular tissues, result in a dwarfing the assimilative power of developing dental tissue, and cause a corresponding deficiency of the materials which resist decay, a condition widely different from arrest of development, though both result in a deficiency of lime-salts. In a recent paper, it has been set forth that the power of a tooth to resist decay is not in proportion to the amount of lime present, but is due to the arrangement of these salts in the tooth-structure. In support of this theory the statement is made that there is as much lime in decalcified dentine as there is in living healthy dentine. In view of well-established facts as to the relative proportions of lime in enamel, dentine, and bone-tissue, I am led to give figures at variance with those of the author of that paper. In adult man, enamel, according to the analysis of Bibra, contains of phosphate and fluoride of calcium 89.82; the dentine, according to the analysis of Heitz and Rees, 66.72; and bone contains of mineral substance, 54.51.

The analyses of these eminent chemists differ from the conclusions

drawn in the paper referred to, in that the largest amount of lime-salts is present in the hardest dental tissue. It will be seen also that at the time of life when teeth are best able to resist decay they contain the greatest proportion of earthy material, as is shown by the following figures from Berzelius: In the tooth of an infant he found that earthy salts composed 65 per cent. of the whole tooth-structure, and in a child of six years, 71.43 per cent., with a corresponding increase at the ages of twenty-five and thirty.

Among most of those who have made dental pathology a study there is general recognition of the fact that teeth resist decay in proportion to the quantity of lime-salts present, and to vitality and early developmental perfection, and that the conditions which render decay possible are faulty development of structure and lack of the earthy salts. For the past seven years the view has prevailed throughout the profession of a deficiency of the lime-salts in tooth-structure, and the attempt has been made to supply them by the administration of lacto-phosphate or other salts of lime. A supply to mothers and children of the necessary materials for forming tooth-structure is excellent practice, but, unless the mode of life is such as to cause a demand for them by the teeth from the general pabulum of the body this treatment will most likely fail of the desired results. It is not enough that one take meat and other food rich in muscle-forming material, but proper exercise is needed to bring the muscles into activity in order that the food be assimilated, and strength of muscle acquired. A well-known fact in physiology is that the quantity or quality of food eaten will not afford a reliable basis for an estimate of the net results in organized structure.

For some years past an explanation as to the local agents causing dental caries has been sought in so-called disease-germs existing in atmospheric air. In every theory of the etiology of caries there is doubtless some truth deserving attention, and in the suggestion noted there is probably a hint which will contribute to the final solution of the problem. Meanwhile, from the storehouse of facts at our disposal a certain series may be selected which seem to favor several very different theories of decay.

After one has carefully studied the germ theory, it will seem clear that whatever the medical profession may be able to prove as to the part that germs play in zymotic or other diseases of the soft tissues, the light thus thrown upon the question of dental decay will be small. If those who advocate the germ theory of dental caries admit the previous agency of an acid which unclothes the organic portion of the tooth-substance, they adopt precisely the doctrine that Magitot's experiments nearly proved true several years ago. His claim is that caries is produced by putrefactive and fermentative processes about

the teeth resulting in acids; as the tooth is deprived of its salts, more acids are produced from the products of fermentation and putrefaction, and from the contributions of the food and fluids of the mouth. In these two processes, germs of various character are present. They are to be found in a carious tooth, and they may be artificially produced in a solution at moderately warm temperature (about 60° Fahr.) when in addition to oxygen there are present an organic carbonaceous substance, a nitrogenous substance, and a phosphate.

Fermentation is a spontaneous change of a liquid or substances producing substances that did not previously exist, varying in acidity according to the temperature, length of time, and ferment used. Putrefaction is the decomposition of an albuminous substance when deprived of life and placed under special circumstances as to temperature and moisture. The most common products of putrefaction are water, carbonic acid, acetic acid, ammonia, carbureted hydrogen, and the volatile order of semi-putrescent substances. It has been known for many years that both of these processes are attended with swarms of microscopic germs, which are found in yeast, vinegar, sugar, and various fermentable substances. The terms "bacteria," "germs," "micrococci," include races of organisms whose names are legion; they exist in untold millions in the atmosphere we breathe, and in our drink and food. It is claimed that a peculiar species is responsible for the existence of each known contagious disease, such as small-pox germs, yellow-fever germs, typhoid-fever germs, measle germs, syphilis germs, and in the minds of those of strong imaginations, a germ that has for its special object the destruction of human teeth during life; but strange to say at the death of the human body, its ravages cease. The soft tissues are destroyed, but the teeth and bones are left for ages with their usual density. It is evident that if germs do exist in these various pathological conditions they must be of distinctive character. It seems strange that the supporters of this theory of decay should attempt to maintain their position merely because germs are found in a carious tooth-cavity, when it can easily be proved by a simple experiment out of the mouth that *in themselves* they have no power whatever to decompose tooth-structure.

It is known that these germs multiply and reproduce themselves at the expense of the tissue in which they live, which must therefore be favorable to their reproduction. It must be admitted that they cannot reproduce themselves from carbonate or phosphate of lime and magnesium. The only substance, then, favorable for their reproduction in a tooth is the organic portion. *Now, let us see what is the proportion of tooth-substance in which it is possible for them to exist.* We will first take the analysis of enamel, from the tooth of an adult

man, by Bibra. He found of lime, magnesium, and other salts, 96.-41 per cent.; organic substance, 3.59 per cent.; and in the tooth of an adult woman 94.03 per cent. of lime and magnesium, and 5.97 per cent. of organic substance. In dentine the bony earth varied from 71 to 78 per cent., while the cartilage or organic portion ranged from 20 to 29 per cent. Other analyses by Berzelius, Pepys, Heitz, and Rees give about the same relative proportions. It is readily seen that but a small proportion (only about 5 per cent. of enamel, and 25 per cent. of dentine) is at all favorable to the reproduction of germs, and even this is not especially favorable for their germination, as it is buried or loaded with great quantities of lime-salts (from 80 to 90 per cent.), which act as a positive barrier to germinal reproduction.

But Arthur S. Underwood, and J. Mills, of London, believe that the bacteria secrete or excrete the acids—in other words, they are acid-forming bacteria, which, after loading themselves, crawl down the tubuli and there disgorge the destructive fluid. *The New England Dental Journal* says, "Admit the bacteria, and then you have caries as a natural result."

These are questions of fermentation and putrefaction. Are the acid products secretions from living organisms, or are they direct chemical products? I have very good reason to believe that the advocates of this theory will find ample authority in the works of Beale, Pasteur, and Tyndall to convince them that these acids are formed by the entire decomposition of the proximate principles. For example, in the fermentation of sugar, starch, gluten, and in the recombination of their ultimate principles—oxygen, hydrogen, carbon, etc.,—in new proportions, by which new compounds are produced, and this breaking up of the oxygen, hydrogen, and carbon of the substances is brought about at the same time that germs are reproducing themselves in the decomposing mass. When we call to mind the marvelous rapidity with which they reproduce themselves under favorable circumstances, it is doubtful whether they have time for anything else, especially in relation with enamel or dentine.

Finally, I will quote a sentence from Tyndall, upon whose experiments is based the germ theory of decay. He says: "There can be no doubt of the fact that, for the nutrition and multiplication of bacteria, *acid infusions are less suitable than neutral or slightly alkaline ones.*"

From reliable sources of information upon the subject of bacteria, then, we are led to the conclusion that their object is to reproduce themselves, and to exist at the expense of decomposing matter, and that the reaction of the fluid which best favors their germination is not acid, but neutral or alkaline. A further proof of this is presented

to us in every-day practice. During the progress of the affection known as Riggs's disease of the gums, a pocket is often formed by the root of a tooth and the surrounding gums. If the contents of this pocket be examined, large numbers of living organisms will be found present, in a neutral or slightly alkaline medium. One would suppose that if germs had any power at all to decompose tooth-structure, this would be a favorable condition for their activities. It is found, however, that caries of the root seldom occurs in odontolithus.

Beale and Pasteur were the first to demonstrate to the world the action of germs upon soft tissues and various liquids, and their multiplication under diseased conditions, and Lister was the first to make a practical application of this knowledge, in the use of carbolic acid as an antiseptic, now known as the Lister dressing. It is a fact that a small quantity of carbolic acid will arrest germinal development, and I think it may be also regarded as true, that if this antiseptic be thoroughly and persistently used in a carious tooth, decay will be arrested. I am aware that this has been offered as evidence that germs cause decay. Thus, carbolic acid kills the germs, and decay is arrested, but it is just as true that carbolic acid arrests fermentation and putrefaction, and therefore the organic acids cannot be developed.

Finally, to demonstrate in a simple way the power of germs to decompose tooth-structure, a solution was prepared which is said to be most favorable to their growth, composed of organic, carbonaceous, and nitrogenous substances, with a phosphate. In this was placed decomposed tooth-structure in order that germs identical with those found in decay might be present to multiply; also sound teeth, that action upon them, if any, might be noticed, care being taken to keep the liquid neutral or alkaline. To afford every facility to the germs, teeth were pounded up and placed in the solution; but at the end of two months not a trace of lime could be found in the liquid, nor was there the least softening on the surface of the teeth, while there were millions of spore-germs, micrococci and bacteria, floating about in the solution.

Some experiments have recently been made, which are said to prove the absence of acids "along the line of action." So far as I am informed, these tests were for *acetate*, *lactate*, and *citrate* of lime. From the same source comes the statement that, although the contents of carious cavities do redden litmus, this test is not reliable and does not prove the presence of acids. It cannot be supposed that the absence of citrate, lactate, and acetate of lime, even in fifteen cases, is going to prove the absence of at least fifteen or twenty other organic acids which it is possible assist in destroying tooth-structure; nor is it reasonable to suppose that under the fermentative action,

in the presence of varying quantities of numerous acids, any acid salt can be perfectly created or in sufficient quantity to respond to any known test. It has been said that a carious tooth-cavity is a "whole chemical laboratory." With some modification, I am inclined to accept this statement, so that, if by chance acetate or lactate of lime were formed, and in the presence, possibly, of numbers of other acids, their existence would be of short duration.

In regard to the reliability of litmus tests for acids in those cases, it must be considered as very significant that a healthy, flowing saliva turns red litmus blue, and this saliva also destroys the power of a tooth to turn it red. It is also true, that the litmus test usually indicates alkalinity about sound teeth, but in a mouth where decay has made much progress it indicates acids. The decayed portions of forty teeth extracted by the firm of Flagg & Osgood (which, through the kindness of Dr. Flagg, I have been able to test) turned blue litmus red. These tests I have here to show you.

Now, it is readily seen that, if there is a substance or compound not acid, that has the peculiar property of turning litmus paper red, it must be a product of the fermentative process carried on in the cavity, and it should be shown what that substance is. It must also be shown what substance in the saliva, not alkaline, has the power to neutralize the apparent acid reaction of a carious tooth. The scientific editor of the *N. E. Journal* should also tell the dental profession the modus operandi of testing for acetate, lactate, and citrate of lime in carious teeth without the use of litmus. One at once realizes that it will be a difficult matter to demonstrate the presence in the oral cavity of two agents (not acid), one responding to alkaline, and the other to acid tests, and able to neutralize each other.

In thus reviewing the acid and germ theories of decay, the various arguments only serve to strengthen the conviction that acids are the primary local cause, and although a great number and variety of germs are found present, they are simply attendant upon the fermentative process, and can not of themselves destroy dentine or enamel. Their existence at the points of decay is rendered possible by the exposure of the organic substance of a tooth by decalcification, and the presence of favoring substances from food and from this medium being constantly kept at a temperature favorable to germinal development.

A NEW ARTIFICIAL TOOTH-CROWN.

BY W. STORER HOW, D.D.S.

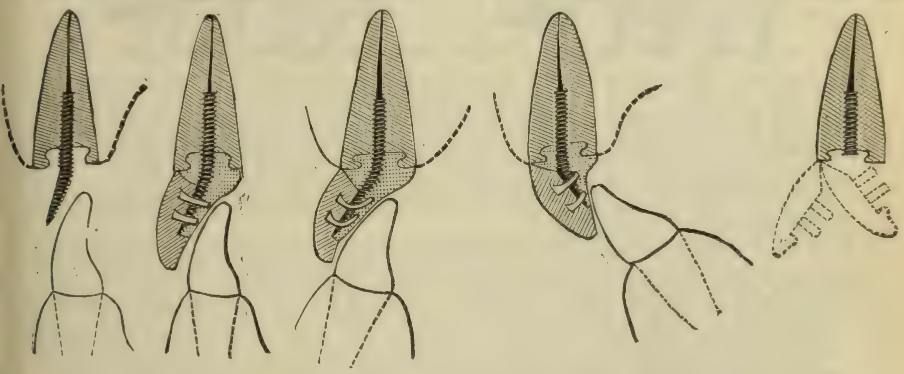
(Concluded from page 240.)

There are some cases of a class which has hitherto presented difficulties that may now be easily overcome by grinding the post flat on

the crown side after it has been set and bent in the root (Fig. 21), so as to be clear of the occluding tooth; and then the crown-pins may be bent over the reduced post, the crown fitted and ground to clear the opposing tooth (Fig. 22), and the backing added in completion.

A similar case, in which the opposing tooth and a proper alignment require an oblique bending of the pins, is seen in Fig. 23, while the reverse arrangement of parts is shown in Fig. 24. The crown is thus seen to be adapted to a wide range of adjustments because its point of contact with the root is at the labial portion of the neck, on which as on a hinge the crown may be swung out or in (Fig. 25, dotted lines), over an arc of at least sixty degrees, at any point of which it may be quickly and firmly fixed. The labio-cervical junction is made just under the gingival margin, and I usually interpose

FIG. 21. FIG. 22. FIG. 23. FIG. 24. FIG. 25.



a thin layer of cement, amalgam, or gutta-percha, or a narrow ribbon or several large blocks of soft gold; the joint always to be made carefully smooth, and hid from view under the free margins of the gums.

The obviously great advantages of such a plan led to the adoption of a single size for post and appliances, but a second size has been proved to be a necessity, and hence the B size is now designed for superior centrals, and cuspids, while the A size is used for laterals and bicuspids, as also for all the inferior roots anterior to the molars. The handles of the tap-chucks and post-chucks are made of small diameter to insure that too great force shall not be used with the thumb and finger in turning in the tap and the post; and it is enjoined upon the operator to remove the tap when it begins to turn at all hard, and repeat the removal until it has been easily turned down to the gauge depth. The cuttings must then be carefully blown or wiped out, so that the post may be easily turned down to the

bottom of the hole without risk of splitting the root, as there is danger of doing with too great force acting on the *débris* as a wedge—hence this caution to employ only a reasonable amount of force and to do thorough work. The disk for grinding the crown-rib is an essential part of the equipment, and when the dental engine is not at hand, the disk may be used in the lathe, by means of lathe-chuck No. 8.

I subjoin extracts from a letter just received from Prof. H. A. Smith, of Cincinnati, who was among the first who received instructions in the uses and methods of mounting these crowns. He says, "I have set quite a number of them for my patients, and can, therefore, speak of their value from the stand-point of experience. I have placed these

FIG. 26.

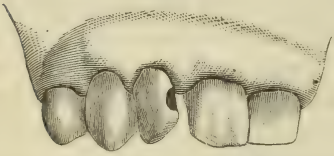
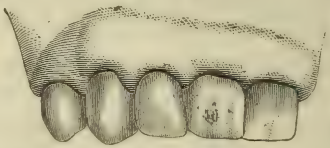


FIG. 27.



crowns on the roots of superior incisors and cuspids; the roots of superior and inferior bicuspids; and have also restored the lost labial and palatine portions of bicuspids with them; all being done with equal facility and like satisfactory results, so far as resemblance and permanency are concerned.

"One recommendation of your process is the ease and quickness with which the several steps are executed by the use of the ingenious set of instruments devised by you, and still another excellence is the facility with which the artificial crown may be brought into alignment with the remaining teeth. In proof of this I will mention one case, the casts of which, taken before and after the operation, I send you herewith. The lateral incisor, you will notice, was much out of line, projecting outward and side-wise. (See Fig. 26).

"The root having been previously treated and filled, I excised the crown, and set your artificial substitute, bringing it into the regular position which you see, (see Fig. 27), and completing the operation in little more than one hour; certainly an excellent result wrought in a very short time, was it not?

"I have thus no hesitation in recommending my professional friends to provide themselves with a set of instruments and give this crown and method a trial, in the confident belief that they will find it a most excellent way of mounting artificial crowns on the roots of the natural teeth."

With these observations by an independent and competent practitioner, the subject is left for the consideration and judgment of the dental profession.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN MEDICAL ASSOCIATION—SECTION ON DENTAL AND ORAL SURGERY.

First Day.

The Section on Dental and Oral Surgery of the American Medical Association held its third annual session in City Hall, Cleveland, commencing June 5, 1883, at 3 P.M.

Dr. Jacob L. Williams, of Boston, presided.

Dr. J. S. Marshall, of Chicago, read a paper on "Denudation or Erosion," of which the following is a synopsis:

After describing the characteristics of the disease, the paper proceeded to consider the hypotheses which have been advanced by different writers to account for the various manifestations which have been classed as erosion. The views of John Hunter, Bell, Fox, Wedl, Salter, and Magitot, were briefly quoted, but dismissed as not offering a satisfactory explanation of all the phenomena involved. As illustrating his view that Magitot's conclusion was wrong, that denudation is the result of caries which has been spontaneously cured by the obliteration of the dentinal tubuli, Dr. Marshall showed the models of a case in which the six anterior teeth and the right first bicuspid were extensively denuded, the enamel being entirely removed on the anterior surfaces, with a considerable portion of the dentine, leaving an inclined plane pointing backwards and extending from the margin of the gums to the ends of the teeth, shortening the anterior teeth about a sixteenth of an inch. The denuded surfaces are not all grooved in the one direction; the central incisors and the left lateral are grooved horizontally like the others, and in addition are grooved longitudinally at the cutting-edges. The history of the case was that fifteen years ago the six anterior teeth were filled by Dr. Allport upon their cutting-edges and labial surfaces with gold, because cup-shaped cavities which had been worn into the dentine by what appeared to be mechanical abrasion; the front teeth originally occluding squarely. Nine years ago the disease was first noticed; two years later it had progressed so far as to make the edges of the fillings stand out above the other tissues on the labial surfaces. These were rounded off and the case dimissed for the time being. The patient was then absent in Europe for four years, at the end of which time not a vestige of the fillings was left, nor even a depression to show where they had been, the surfaces being as smooth and regular as though cut and polished with disks. During the past three years the progress of the disease has been much slower than formerly.

Numerous other cases might be adduced to substantiate the position taken, as well as the fact that denudation does not originate in incipient caries. The views held by Tomes and Harris that it is of chemical origin, though it is the conclusion most generally accepted, does not account for all the peculiarities of the disease. The most rational explanation is to be found in the electro-chemical theory of decay propounded by Mr. Kincely Bridgman. The case recorded by Dr. Eleazer Parmly, of the denudation of human teeth set upon an artificial plate, had always been a mystery to the writer until he studied Mr. Kincely Bridgman's experiments. In the light of these it might be readily explained—the plate and the teeth forming the elements of a battery, and the buccal mucus, which is always slightly acid, the medium by which the current was established and maintained. May we not apply the theory of Bridgman to this disease? The tooth invested at the root by vital tissues forms the positive element; the air surrounding the crown renders that electro-negative to the root; in other words the tooth becomes polarized. The only thing now needed to establish a current is an acid fluid, and this we have almost constantly in contact with the labial, buccal, and approximal surfaces of the teeth at just the points where the disease manifests itself. In Bridgman's experiments only the portion of the copper wire exposed to the atmosphere was rendered negative, the neutral point being reached at that portion protected from the atmosphere, and the greatest loss of substance of the wire was at the surface of the fluid, where it came in contact with the air. As in the case of the copper wire the tooth would be acted upon most vigorously at the junction of its two poles, provided there is an acid medium like the buccal mucus to establish and maintain the electro-chemical action, by which the lime-salts are removed and washed away at the line of junction between the atmosphere and the mucus. This theory would also explain the peculiar phenomenon so commonly seen,—the undercut condition of the grooves at the border nearest the gum. Following the general law of electrical action, the positive element—in this case the root of the tooth—would be soonest acted upon and would show the greatest waste, and as soon as the gum-line was reached the external surface would be protected by the fluid, always present at that point, and the loss of substance would cease, while the other portions of the root would be acted upon with the original intensity, and thus in time the undercut condition would result. Vital resistance must not be overlooked. We have all noticed that teeth of the best organization have stronger vital resistance than teeth poorly developed. The writer had also noticed that denudation oftenest attacked the teeth generally classed as medium or soft, with low vital resistance, the patient often inheriting a peculiar cachexia, the scrofulous or

syphilitic, thus lowering the power of resistance and predisposing the teeth as well as other organs to the ravages of disease.

In the case from Dr. Allport's practice above spoken of, the pulps of all the teeth were alive. Treatment consisted in cutting off a small portion of the surface towards the palatal wall of each of the incisors, without exposing the pulp, and fitting a ring to which a cover of platinum, very thin, was attached, forming a cap; to this cap a porcelain crown was soldered, and the whole cemented to the stump of the tooth with oxyphosphate. The cuspids being only slightly affected were not interfered with, but the probabilities are that in time they will have to undergo the same treatment.

Dr. D. H. Goodwillie. There is no doubt that the structure of the teeth is often affected by certain diseases. By the marks which they leave on particular portions of the tissue we can almost tell at what time the injury was wrought and what it was that caused the disturbance. Syphilis, smallpox, whooping-cough, scarlet-fever, and the pustular diseases have each their characteristic marks by which we can tell at what portion of the eruptive period their influence was felt.

Dr. L. Buffett, Cleveland, had just a word to say. If the destruction of tissue in the disease under discussion is to be accounted for by the electro-chemical theory, it is to be borne in mind that it is only because this action places the tissues in condition to be acted upon by an acid, which, at bottom, does the real work of destruction.

Dr. Jacob L. Williams thought the theory advanced by Dr. Marshall quite plausible. He remembered in this connection a remark his preceptor, Dr. Keep, used to make regarding galvanic action in the mouth—he called it animal galvanic action—and that was with reference to the frequent similarity of the points of attack on opposite sides of the mouth. This statement of Dr. Marshall's puts it in a more scientific shape.

Dr. W. P. Horton, Cleveland. Dr. Marshall propounds a new theory to explain the cause of erosion and makes out a very good case. In the present instance there may have been underlyiug it all a syphilitic taint. Now, the question is, is there any limit set to the period within which such a poison may set up the acid action which causes the destruction, or may it not be antidoted by medication at the proper time?

Dr. Marshall. Did I understand the question to be, was there a specific deposit among the crystals of the forming tooth that would in time develop an acid?

Dr. Horton. The acid or its cause must be inherent in the system. Can it be eradicated?

Dr. Marshall. I did not say it was an acid. That is what I want to find out. I do not think the taint will develop an acid that will

cause this disease. I do think that it lowers the power of vital resistance so that by and by, when the exciting causes come into play, the tooth-tissue is more readily dissolved than it would have been had the vital resistance been normal in tone.

Dr. H. L. Ambler, Cleveland. Dr. Marshall has said in his paper that the teeth usually attacked by erosion are those of what we all know as second quality. The speaker has seen a case, in a man of forty-five to forty-eight years of age where the teeth affected were of splendid structure. The lower incisors, cuspids, and bicuspids were deeply grooved, right at the free margin of the gums; the right bicuspid was cut entirely off, and the surface was smooth and polished, presenting a translucent appearance as though you could see a little way into the dentine. The rest of the teeth affected had cavities, all as smooth as polished dentine could be. In treating, he adjusted the rubber-dam so as to leave plenty of space between the holes, squared the margins, and with small inverted cone-bur run by the engine made four little pits in each; these pits were filled with non-cohesive gold annealed, and the remainder of the cavity was filled in with cohesive gold. Extra care was taken with the fillings, and they were made as perfect as he knew how to do it. He advised the patient to drink Catawba (sour) wine and eat pickles freely. One year afterwards the teeth and fillings were in good condition. Since that time the patient had passed out of his observation.

Dr. T. W. Brophy. Was it your opinion that the sour wine and pickles exerted a beneficial effect?

Dr. Ambler. I rather judged so. I had been talking with Dr. Watt, our chemist, on the subject of alkalinity in connection with such cases, and these measures were advised as prophylactic.

Dr. Marshall. Did you think that the pickles or the gold fillings arrested the disease?

Dr. Goodwillie. The causes of this disease are either local or constitutional. Syphilis is *the* virus of viruses. If vitality is so impaired that nature has not the power to assert herself and throw off the influence, some day there will come an evidence of the impression. He has seen the primary, secondary, and tertiary stages developed within a year; and again the primary and secondary would develop within a year, and the tertiary would not show itself for twenty years afterward. He instanced the case of a child five years of age, the father of which had contracted syphilis eighteen or twenty years previous, and afterwards married. The first child of the union was alive, the second and third were dead, the mother was dead, and this child was the first fruit of a second union. He had to remove the whole of the upper jaw. If the child had had vitality enough to go on to maturity before the symptoms were developed, we might have

had such marks on the teeth as those in the cast shown by Dr. Marshall—we cannot tell; but it could not throw off the taint, hence came the operation described. We never know when the vice of syphilis has left the system. As to the local exciting cause, it may be acidity, it may be galvanic action.

Dr. Horton. The question I asked was, was there not some definite point during the construction of the tooth when nature's processes were interfered with by some specific element? Dr. Goodwillie says there was a disturbing element, and we have the marks of the interference on the teeth themselves. Now, is there any period within which this interfering element performs its work of disintegration. My opinion is that the local disturbance arises during the period of formation of the teeth. My experience is that the development of the denudation may occur at any age,—at from sixteen to twenty-one, or from thirty-five to forty,—the last is the most usual age.

Dr. Marshall. I think Dr. Horton mixes the constitutional and the local causes. In my paper I distinctly stated that it was more apt to occur in the mouths of patients who have suffered from the inherited form of syphilis; have seen it in patients as young as sixteen years of age, but in most cases they are above thirty.

Dr. Horton. Would denudation be apt to occur if the patient were inoculated with syphilis after he had arrived at manhood?

Dr. Marshall. I do not claim that syphilis is the exciting cause of the condition under discussion. It is simply a predisposing cause.

Dr. Ambler, in answer to Dr. Marshall's question as to the efficacy of the pickles and gold fillings in preventing a recurrence of the disease in the case he had described, thought they did no harm, if they did no good. The disease was arrested.

Dr. Marshall thought as the case had only been under observation for a year that he could not be sure of that.

Adjourned.

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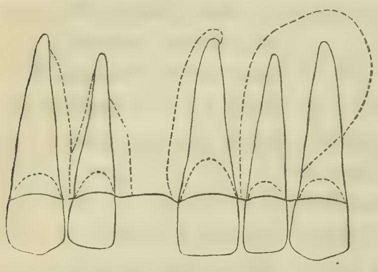
Second Day.

The Section was convened at 3 P.M. by Chairman Williams.

In the absence of the essayists whose papers were to have been read at this session, Dr. Marshall described a case of pyorrhea alveolaris occurring in the practice of Dr. W. W. Allport, in which remarkable results had followed treatment. The patient was a merchant, forty-six years of age, of good general health; no history of syphilis, but there was a family tendency to scrofula; at the time he presented, the patient had been under treatment for some time for a chronic inflammation of the kidneys. The right central had been lost some

five or six years before. The teeth most affected were the remaining incisors and the cuspids of the upper jaw, whose condition, as developed by examination with the probe is shown by the sketch on the blackboard (see cut). On the labial surfaces the probe passed to the points indicated by the dotted lines around the teeth; in the case of the left lateral and canine the attachment to the sockets was almost completely broken up on the labial surfaces, only a small



septum of normal tissue remaining near the neck of the canine. On the palatal surfaces the attachment was normal. A discharge of pus from around the necks of the teeth was first observed some two years ago. When the patient presented the exudation of pus was very profuse; slight pressure would cause it to flow freely, and at times as much as a half teaspoonful would be taken from the large pocket surrounding the roots of the left cuspid and lateral. The case was treated by Dr. Allport, by carefully scraping the whole of the denuded surface of the teeth and of the bony sockets with thin, narrow chisels made specially for the purpose. Aromatic sulphuric acid was then applied, the first time of full strength, afterwards one part of the agent to three parts of water, the case being seen every day for a week; then glyco-phenique of full strength was applied with a Farrar point passed to the apex of the teeth, the preparation being allowed to work its way downward. Treatment was begun Feb. 23, 1883, and on May 11, 1883, the case was discharged cured. The attachment of the teeth to their sockets appeared firm, though there was some recession of the gums, as shown by the dotted lines across the teeth in the diagram. There seemed to be a new deposit of osseous tissue around the roots of the teeth.

Dr. Goodwillie. Was there any examination to determine the condition of the pulps? Were they dead or alive?

Dr. Marshall. No special attention was paid to this point, but the presumption is that the pulps were dead.

Dr. Goodwillie. The pulps were probably dead. It is a principle of surgery that bone can be reformed in cases of necrosis if there is no pus to prevent it. If there were any devitalized pulps in this instance, they would probably cause disintegration again, unless treated properly. It is necessary when pus forms to make a good opening in order that it may have an opportunity to get out. Oftentimes alveolar abscesses open into the nostrils, and we have frequently cases of so-called catarrh from such causes.

Dr. Talbot could hardly credit the possibility of such a case, were

not the evidence so strong. We all know that the tendency of the alveolar process in these cases is to recede. He has seen no cases in his own practice where it was reproduced after having once been disintegrated; he has seen it contract and still keep the tooth in place, but he could not understand how it was possible that reproduction of the bony tissue could be brought about.

Dr. Marshall was glad that Dr. Goodwillie had brought up the subject of alveolar abscess simulating catarrh. A case of this character which had come under his own observation was that of a gentleman aged thirty years who had been under treatment for catarrh for a year and a half. Coming to have his teeth cared for, the central incisor on the right side was found to be devitalized and tender; it always gave trouble whenever a cold was taken. It was also noticeable that the catarrhal discharge was always from the right side. He opened into the tooth and found after cleansing it that water could be forced through it into the nostril. The tooth was treated and with its cure the catarrhal trouble disappeared. Another young man—a student of dentistry—had an incisor which had been devitalized by his preceptor. It was neglected and an abscess formed. He also had a discharge from the nose. On examination the condition of the incisor was discovered, and on its being treated the nasal discharge disappeared.

Dr. G. S. Shattuck, Detroit. In the case of pyorrhea alveolaris reported by Dr. Marshall, was there any deposit of tartar?

Dr. Marshall. Yes. The scraping of which I spoke was performed several times, and was quite a painful operation.

Dr. Truman W. Brophy, Chicago, had seen this case while it was under treatment. The results achieved were certainly remarkable, and were to be attributed not only to the skill with which the case was treated, but also to the vigorous condition of the patient. There is now not a vestige of suppuration; the gums are pink, and the teeth firm in their sockets, which seem to be thoroughly restored. As a rule teeth in the condition in which these were when the patient presented for treatment would be lost, it being only a question of time. The results reached here should give us encouragement to make the attempt at cure even where the case presents formidable obstacles. In connection with the treatment of alveolar abscess, Dr. Brophy commended the use of peroxide of hydrogen. Much is claimed for it; it has the most marked antiseptic properties—even greater than carbolic acid. It is carried into the sac and immediately following its introduction a foamy mass passes out. This is said to be due to the action of the drug on the decomposing fluid in the sac and to the destruction of the bacteria. It is applied on cotton before suppuration begins, and presents the most remarkable results with

pus or blood not entirely decomposed. The use of sulphuric acid has been criticised by some, who claim that it has no power on necrosed bone. The speaker has had good results in his own practice, and regards it as an excellent remedy. It destroys the necrosed bone, but acts only slightly on healthy tissue.

Dr. Shattuck had been treating a right central affected with pyorrhea alveolaris. The anterior plate of the alveolar process was all gone, and a probe could be passed to the apex on the anterior surface. Treatment was dilute aromatic sulphuric acid once in twenty-four hours, washing clean with water twice a day.

Dr. E. C. Briggs, Boston, questioned the correctness of the statement that new bone had been produced in the case reported by Dr. Marshall. The only evidence of a reformation of bone is the feeling of hardness of the gum and the firmness of the teeth. This is hardly enough. There was no periosteum left to reproduce the bone and that result seems impossible under the circumstances. He had had a case in which the alveolar process, from the superior central to the third molar, was affected, resulting in the loss of the whole of the outer plate of the alveolus and a portion of the inner. After removal of the necrosed bone, the soft parts were stimulated, resulting in complete filling up of the space occasioned by the loss of bone. The gum presented a natural appearance, with the exception of one slight depression back of the canine, and felt as firm and hard to the touch as before. In this case Dr. B. was positive there had been no new bone-formation.

Dr. Marshall was inclined to think that in the case he reported the periosteum was lifted from the bone, not destroyed, and thus was able to assist in the new formation.

Dr. C. R. Butler, Cleveland, could see no reason why Dr. Marshall or Dr. Briggs should be at a loss to ascertain the condition about the roots in the cases they had reported, or to decide whether the formation was cartilaginous or osseous. The exploring probe would determine the matter surely to the educated touch, with only slight pain to the patient. It does not follow that the pulps were dead, even with the amount of suppuration reported in Dr. Marshall's case, though it would be safe to say that they were dead in many such cases. That should be one of the first points to be determined. We may get contraction of the tissue about the necks of the teeth, sufficient to hold them firmly where the transverse septa are lost, even when the cancellous portion of the bone has been dissolved out. You cannot have abscess or death of bone without suppuration. That is nature's method of getting rid of it. Many overdo their treatment by washing out too much, but more err on the other side by not cleansing as much as should be done. He regretted that we had

not a clearer diagnosis of the case. If the bony sockets have been restored as has been reported, we ought to have some better knowledge of what the evidence is.

Dr. Talbot thought such cases should be managed on the general principles of treatment for carious bone in any part of the body. The necrosed bone should be cut or scraped away or otherwise got rid of, and then reproduction of bone can take place.

Dr. Marshall. I will have the teeth examined on my return to Chicago, and will forward to the DENTAL COSMOS, in time to appear with its report of this meeting, a statement of the condition of the pulps of the left lateral and canine; also, the result of the examination into the character of the new formation in the sockets.

[We have pleasure in presenting the following from Dr. Marshall:]

TO THE EDITOR OF THE DENTAL COSMOS:

Dear Sir:—As I promised the members of Sec. VII., of the American Medical Association, I send you the result of the examination made by Dr. W. W. Allport and myself of the case of pyorrhea alveolaris (reported by me for Dr. Allport) relative to settling two points, viz.: *first*, if there was really a *new formation of bone* about the roots of the teeth, and *second*, if the left lateral incisor and cuspid were *still vital*. In regard to the *first* I would say that an exploring needle was passed through the gum in four different places over the roots of the teeth mentioned and between them. In each case it met with *firm resistance*, giving evidence to the sense of touch of the presence of bone-tissue.

To the second I would reply, that on applying a piece of ice the patient exclaimed, "I could have told you that without hurting me in that style." The teeth are quite sensitive to the application of cold, and the color is normal, so that *there can be no doubt about their vitality.*

Inasmuch as Dr. Allport is positive that he passed his instrument entirely over the ends of these teeth and scraped and smoothed them there in his treatment of the case, there can be no doubt that the pulp-connection at the apex was severed. Now arises the question, how can we account for the vitality of these two teeth? Has there been a union—which is very improbable—of the vessels and nerve of the pulp at the apex? Or, is the vitality maintained, as Dr. Allport believes, through a vicarious function of the pericementum? The latter view seems to be the most probable explanation of the phenomenon, for it has been demonstrated beyond doubt that vessels sometimes penetrate the cementum and dentine, and anastomosis is established between the vessels of the *pulp* and pericementum. Canals for the passage of the vessels have been demonstrated out of the mouth. Dr. Barrett, of Buffalo, N. Y., demonstrated incidentally the fact of their presence while experimenting with a solution of gutta-percha and chloroform as a filling for pulp-canals. He found that it penetrated not only the most tortuous canals but passed through certain canals in the sides of the root having an external opening.

Very truly,

JOHN S. MARSHALL.

Dr. Talbot had had two cases of septicemia as the result of neglected alveolar abscess. The first was a married lady, aged thirty-five. When preparing to go to the seashore some years ago she was

suffering from a severe toothache in the left first superior bicuspid, for which she had called on him. He diagnosed a dead pulp and thought the tooth was bordering on alveolar abscess. He drilled through a filling to the pulp-chamber, and treated temporarily, advising her to have it treated properly on her return to Chicago. Having no further pain she declined to do so, for two years. Her health began to fail, she had no appetite, and finally became unable to retain food on her stomach, nourishment being injected per rectum. She had frequent violent fits of vomiting. Last winter she was advised to go to the seashore, where she remained two weeks, when there was considerable swelling of the face—the first thing noticed in regard to her teeth since her troubles commenced. Finding no improvement she returned, and was sent to him. On removing a piece of cotton from the cavity in the tooth he had treated two years before, a most offensive odor issued. She had a vomiting spell in the office, and afterwards was confined to her bed for two weeks, when she commenced to recover. He visited her two or three times a day to cleanse out the cavity. In three or four weeks she commenced to rally, and now at the end of six months her health is completely restored.

The second case was a young lady, who called Sept. 7, 1882. She was anemic; had no appetite; her eyes had been treated for two years for conjunctivitis, without relief. The gums were in an edematous condition, saliva ropy, and mixed with pus; pus discharging from fistulous openings, and also from eight abscesses in different parts of the mouth. Upon exploring a fistulous opening at the margin of the gum between the roots of the left lateral and canine, caries was found to have extended into the antrum as far as the floor of the orbit. Two years previous while undergoing a dental operation she took offense at her dentist, and since that time nothing had been done to her teeth. Treatment was commenced by removing all foreign substances from the necks of the teeth, cleansing the canals of the teeth having abscesses, and injecting carbolic water into the opening in the jaw; tonics were given to aid digestion. At the end of three months the teeth were in a healthy condition; patient had also improved slightly in appearance. Attention was then directed to the carious bone. A tent of cotton inserted into the fistulous opening between the lateral and canine to enlarge it caused intense suffering; patient's face was swollen so that one eye was closed, and the flesh had a bluish cast. The tent was removed and the accumulation of fetid matter evacuated. Morphia was administered to quiet the pain, but there was no sleep for thirty-six hours; pulse was high, temperature averaged over 100°. Her family physician attended her with the speaker, and at the end of three weeks she was able to resume her visits to the office. The cleansing pro-

cess was continued, and in March patient was so much improved that she was sent East to spend the spring months.

Adjourned.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting, February 20th, 1883, held at the residence of Dr. William Carr.

The president, Dr. Safford G. Perry, in the chair.

The discussion of Dr. Howe's paper on "The Best Form of Screw, and its Use in Retaining Fillings," read at the last meeting, being in order, Dr. John B. Rich made the following remarks:

Mr. President: I find myself placed in a rather delicate position when asked to open the discussion on Dr. Howe's paper on "Screws." Last spring I promised the president, Dr. Perry, that I would prepare a paper on that subject, to be read before this society as soon as I could get it ready. The circumstances under which I made that promise were these: the subject of the use of screws came up incidentally at one of the meetings, and I endeavored to point out the errors in the construction of those employed for dental operations. The president thought the remarks I made at that time were of great importance as bearing upon that subject, and after saying so, in a very kind way, endeavored to get a promise from me that I would prepare and read before the society an elaborate, and as far as possible exhaustive, paper on the subject of "The Use of Screws in Dental Operations," and embody in it the substance of my remarks made that evening. After some persuasion on his part, I agreed to comply with his wishes, on condition that the crude remarks made by me that night should not be published in the society's transactions, but that the whole matter should rest until I could present it in a form in which it could receive a clear and comprehensive elucidation.

When I began to arrange the material for this paper I discovered that I had undertaken quite a task, as the subject was one capable of elaborate treatment, and might be made the means of conveying a large amount of information, and to be made thoroughly efficient would require considerable preliminary labor. So I commenced work upon it, but this paper and the illustrations necessary to make it thoroughly understood are not yet completed, and I do not intend to present it to the society until it is in as good form as I can make it. Now, herein lies my embarrassment: I am preparing a paper on this very subject, and am asked to lead the discussion on the one now before the society. I do not want to forestall the information that will be contained in the paper I am preparing, but if I speak at

all upon this paper I shall have to do so to some extent. So far as Dr. Howe's paper treats of the construction of screws for dental purposes, it is based, as he states, upon what I said upon that subject at the meeting last spring. It goes no further and is as crude as those remarks were at the time they were made.

What I may say to-night must not be considered as doing this subject the justice I intend it shall receive from me when I have a more comprehensive basis to treat it from. Where screws are to be employed in dental operations, it is important that the one best adapted to that purpose should be selected. All the screws that I have seen that have been intended for such use have been metal screws, most of them with from forty to sixty threads to the inch. Now, considering the use to which these screws are to be applied—that they are to be inserted in a substance which in its texture and construction is more like hard wood than anything else, and in these particulars not at all like metal—it will be seen that all the well-known mechanical principles that govern the construction and use of screws have been entirely disregarded. The proper form of screw to be used in dental operations is the one best adapted for use in hard wood. The best one for that purpose known is the one that is described and illustrated by figure 631, in the second volume of Holtzapffel's "Mechanical Manipulations," page 666. He has given all the best forms of screws for all purposes known at the time he wrote his work, which was about 1840, and since that time there has been no improvement made in screws, either in the form or arrangement of the thread. The gimlet or taper screw, in the various forms in which it is now manufactured, and supposed by many to be a recent invention, was fully described by him. But there have been great and many improvements in the machines by which screws are now produced. The form of screw which I have mentioned as being the best one known for holding in hard wood, and which in my opinion is the best that could possibly be used in dental operations, has a thread with an acute angle, both sides of which are pitched at an angle of 30°; the edge of the thread is sharp, but the bottom is truncated, which greatly increases the hold on the substance in which it is used. Having ascertained the best form of thread which can be used for dental purposes, the next consideration is how many threads there should be to the inch. I have repeatedly expressed the opinion that there should never be more than twenty, but after having given the matter more careful consideration and study, by means of numerous experiments, instituted to produce accurate data for the paper I am preparing, I am convinced that sixteen threads to the inch would make them much more efficient than any other number, when introduced into dentine, and especially dentine that

has lost its vitality, and consequently a portion of its strength. There are many details in connection with the use of screws for dental purposes, which I will treat at some future time when I shall have such illustrations to assist in their demonstration that my views upon this matter may be distinctly understood through the medium of the eye as well as the ear.

Dr. Dwinelle. I introduced gold screws to the profession in 1854, for use in nerve-canals and all places where they were admissible in living and dead teeth. I used, invariably, gold screws, employing Stubs's screw-plates in their construction. I have used them successfully in living and dead teeth.* I have some living teeth in my own mouth in illustration of what I am about to say. My two front teeth are built up entirely with gold, and they are established, confirmed, and retained in their places entirely by gold screws in the dentine of the living teeth. I have worn them for nearly ten years, and I could show hundreds of similar cases, the result of my operations in 1854, '55, and '56, that have been entirely successful.

It is astonishing how few turns of a screw in the living dentine will establish it firmly and compactly in place. Four or five sometimes are quite sufficient, and it will endure the test of time. We all know as soon as the dentine is dead how frail and uncertain, how punky and soft it becomes, but when vivified it is stronger and tougher than ivory. I feel a little sensitive in speaking on this subject, because I am not generally believed in what I say in many of these respects; that is to say, when I first introduced this matter to the profession through my "Treatise on Crystallized Gold," I was not believed at all, and was dubbed the Munchausen—the biggest liar—of the profession. I bowed to the decree of fate, but my motto was, "Time will show;" and time has shown.

Dr. Straw. I can simply say that I have had all my superior incisors built down; two of them on Sunday, because it was a day on which I could not work myself. The wife of the dentist said that they never would stay, and sure enough two out of the four that I had capped on Sunday did come out, and were afterwards replaced with pins on week-days and they are there yet.

Dr. Dwinelle. Perhaps my remarks were considered somewhat extravagant in reference to inserting shallow screws, but I will tell you how my two front teeth were operated upon. In the labial portion of the tooth the screws were comparatively shallow, the two standing opposite and equidistant from each other; but the screw that was on the lingual side, though quite deep, was successfully es-

* I used them for the purpose of retaining gold fillings in their places; for the purpose of attaching gold-banded, or ferruled crowns to the roots of teeth, and for all other practical purposes in connection with the teeth.

tablished in its place without interfering with the pulp in the least. As you are aware, the dentine and enamel seem doubled and thickened at this locality, so that you can with impunity make a deeper penetration and get a deeper screw-hold there than at any other point. We take advantage of this provision of nature and locate there a larger and deeper screw.

Another reason why the crown built up in that way will stand mastication is, as we are all aware, that small screws placed laterally to each other will hold a crown to better advantage than a large central screw, because the pressure is distributed and the mechanical influences are balanced and distributed on the principles involved in the long and short lever.

Dr. Rich. I will say that one of the reasons that the matter of this paper has been delayed so long has been the endeavor to produce a better screw than can be made of gold. A gold screw isn't the strongest we could have for the purpose for which we want to use a screw, and I think one will be introduced for dental purposes before long that will have much greater strength and more durability than a gold screw—a screw of steel. The difficulty to get over is so arranging the steel that it will not oxidize.

Dr. Dexter. I would like to ask Dr. Rich if he knows of any instances that will illustrate to us the bad effects of screws in living teeth from thermal changes. I believe that screws put into teeth that are alive or dead—in fact any metal that comes in contact with tooth-substance and particularly with living tooth-substance—will be far more apt to produce trouble in teeth than different methods of attaching fillings, on account of the increased surface of thermal change brought directly in approximation to living tissue. It has been a theory of mine, upon which I have worked for some time, but I never have had any other than my own experience for it.

Dr. Atkinson. There is a screw made by Dr. Osmun that has the coarsest thread of any I know. The head of that screw is split so that it is divided into four quarters. With this form you are able to get a very good hold, and after building the gold around the screw, or two or three screws, as may be needed, then you build up over that and spread those four corners out; this makes a very good retaining hold on the dentine, and I have never lost a tooth that I have treated in that way. I have used this for where teeth were badly worn down and badly split, with satisfaction; and the only thing that I have used excepting the creasote is inspissated balsam of fir, that is almost as stiff as resin; I warm the screw and dip it into that and screw it right in. I usually desire to leave a portion of the depth into which the screw is to go undrilled, so as to let the screw itself do a little of the cutting. I don't want more than a

turn and a half, and if I have three quarters of a turn into the dentine I am quite sure that it is safe.

The remarks made by Dr. Rich are so self-evident that it seems to me any man acquainted with mechanics must necessarily understand that we should not have the threads so near together as to cut up such friable substance as the dentine is. I have had a large experience in this, and have known a great deal of controversy about it. I remember one instance in particular where the screw encroached upon the pulp-chamber without its being known by the operator at the time, that did give trouble, and in the attempt to remove it when the gold was cut out and the screws were taken out blood followed one of the canals; that occurred in Baltimore. But if anyone has to make four or five turns to get a hold, he has condemned in that the construction of the screw. If I can get a three-quarters turn completely into the cavity I am satisfied that it will retain it well.

The same kind of treatment which I am using to fill a tooth I hold to be the best in my knowledge for filling a canal; fill it in with balsam of fir, and then warm your screw sufficiently to make the balsam fluid, and screw it in.

Dr. Howe. I did not intend to say anything, but Dr. Dexter's question causes me to refer to points contained in the paper. I expressed an opinion on the use of screws in living teeth, as well as on the drilling of retaining-pits, into which gold is packed (both coming, in the sense in which he speaks of them, in the same category). I have several times seen pulp-devitalization that I believe was caused by the insertion of fillings depending on screws or retaining-pits drilled into living dentine in dangerous proximity to the pulp, and I have expressed the opinion before that the pulp does not bear the same degree of approach from a substance which is a conductor when the lesion is mechanical, and consequently sudden, as it would do if that proximity was brought about by the slower process of caries, and consequently we may often pack gold with safety in the bottom of a cavity which has been produced by caries, when the same relative depth of cavity might not safely be made by drills, and filled with a good conductor of heat. In the former case, of course, the pulp has had time to protect itself. In regard to Dr. Rich's remarks, I would say that, if I had known that he was working on a paper on the subject of screws, I should not have been willing to present this subject. So far as I have spoken on the *form* of screws, I have followed the lead of his suggestion. I think, however, I have explained in some degree the relation, in point of strength, of the metal and dentine, as he did not, although the germ of all the thought was embodied in his remarks made about a year ago. I am perfectly willing to concede to him entirely the credit of

the thought on this subject of the form of screws. So far as the hurried thoughts I have presented relate to the use of screws, they are the result of observation and experience, and the whole matter was presented only at the request of members of the society because I had made some of these screws for my own use, the appearance of which seemed to please them.

Dr. Bogue. A gentleman came into my office once upon a time with a pivot-tooth in his hand and a very much broken-down, decayed root in his mouth, and wanted to know if the tooth could be put back. I didn't see any way of doing it, until all of a sudden my eye fell on a knitting-needle that some one had laid down, and I took the needle up and put it in the tooth, and it happened to fit. So I cut off a piece of the knitting-needle just the length of the cavity in the root; excavated a little bit into the root; filled it up full of copper amalgam, putting the steel pin into the root first; then putting the old tooth on, I gently malleted it into place, making a perfect nest for the tooth to fit into the amalgam.

I then gently withdrew the tooth and sent the patient about his business with the steel wire in his mouth. All this took, I suppose, about five or six minutes. The amalgam covered entirely the end of the root, of course protecting it from further decay for a long while. The next day or some time afterwards he came in again, and meantime I had fitted a wooden pivot into his tooth. With a pair of forceps I pulled out the knitting-needle and put this tooth with the wooden pivot in its place, and he has a good tooth upon a poor, miserable root.

Dr. Dexter. I am in favor of wooden pivots, but I would like to ask Dr. Bogue why he took the steel pivot out and put a wooden one into that metal socket—why didn't he leave it there? I should have done so.

Dr. Bogue. Because I wanted to hold the tooth in the root, and the steel pivot would not do it. There is another objection to steel. A gentleman who was with me in Cleveland put a tooth on a gold crown with a steel pivot and built it round, depending upon the steel for the strength of the work. Some time afterwards, I don't know how long it was, it broke off, and when we came to examine it we found that it was carbonized so that it was as crumbly as charcoal. I don't understand what the nature of the case is, but steel does rot in the mouth. I don't know but it might be so protected by amalgam as to prevent that oxidation, or rather carbonization.

Dr. Dexter. About the use of steel in the mouth I have had and am having considerable experience. I like steel; it is strong above all other metals that we put in the mouth. I don't mean to say that a moderately tempered pin will hold a tooth or anything else; but

steel properly tempered, and of proper thickness and properly fitted, will hold a tooth better than anything else, if you keep it covered from the air. I never saw steel rot. I did not know it would. I have used it for four or five years. I have seen a considerable quantity in use, exposed directly to the effects of saliva, and have had some steel in the mouth directly exposed to the effects of saliva for a year and a half, and it has neither rotted nor rusted. I find that the statement of Dr. Coffin, that steel blackens and stays shiny as though it was black-polished steel instead of bright-polished steel, is pretty generally true. I have got some of it in the mouths of patients now.

As to this steel peg in this tooth, or as to a steel peg in any tooth where it is put in as this one was, inside of a metal socket of amalgam in the root, that part, certainly, carefully protected from moisture and air, if it had been likewise set into the crown in the same way, and if that steel had been properly tempered, it would have held the tooth better than anything else that could have been put in.

Dr. Ambler. In corroboration of the statement of Dr. Bogue that steel will rot in the mouth, allow me to state a case that came under my observation some years ago.

A lateral incisor was filled by a dentist in the interior of the State some five years previous to my seeing it. The filling was well put in, but the tooth became discolored so that there was a black edge perceptible around the edge of the filling. I thought it best to remove the filling, and did so. At the bottom of the cavity I found a steel bur that had broken off, and probably the fact had passed the notice of the operator. That bur had been there five years. It was reduced to fully two-thirds its apparent size, so that when I took the bur out and held it in my fingers about one-third of it crumbled off like rust. There is a case in point where steel does rot or corrode in the mouth.

Dr. Howe. I have been very much enamored with steel screws also, and I have been using them about five or six years, and the harvest is just beginning to come in. To-day an upper molar with the buccal wall alone standing presented itself that I had filled with amalgam over four years ago. The buccal wall had been cut down probably one-third of its height, leaving two-thirds standing. A steel screw had been inserted in the palatal root and an amalgam restoration of that crown made over the buccal wall and around the steel screw. It has remained in a very satisfactory condition ever since, and the gentleman coming to-day for another purpose, I examined the mouth, and among others this tooth, and noticed a dark line at the margin of the amalgam and the tooth. Suspecting some-

thing wrong, I introduced, as I was able to do, a very fine point and pried a little on it and found it to give, and then I put a little more force on it and it gave a little more. The result was that I pried it out, and I found that my steel screw had given out. There was a destruction of the surface so that the threads of the screw were destroyed, and the hole into which it had been set was completely blackened, containing a friable black substance which I did not doubt was an iron compound. I suspect that the sulphur of the dentine has something to do with the destruction of the steel. I have just begun to realize that steel won't do for these purposes.

Dr. Dexter. I would like to ask Dr. Howe if he put that screw into the dentine of the root so that it was in direct contact with the dentine?

Dr. Howe. Yes, sir.

Dr. Dexter. Then certainly it will rust. Moisture will come right through and rust it off. But if he had put it where moisture could not get at it, he could not have pried it off with his instrument. If he had lined his root with something else that would not rust and that would keep the moisture from getting at the steel, he would have saved all trouble.

Dr. Howe. The roots of teeth into which it is desirable to set screws are not large enough to admit of complications. We need as strong a screw as possible, but it is also desirable to retain all we can of the dentine of the root. I have used solutions of gums, but I think anything that would occupy an appreciable amount of space would be decidedly objectionable. We want *simplicity* and *strength.*

Dr. Clowes. When I heard Dr. Howe speaking about the steel screws at our last meeting I intimated to him that he was making a mistake. Now, it seems very singular, that when we have a screw that will not oxidize, that we can thoroughly depend upon, like the platinum and iridium, that we should run any risk. There is something that we can depend upon. Why, bless you, Gentlemen, many years ago I went through that steel-screw and hair-pin experience; I have been all through that, and that was the reason why I told Dr. Howe that it would not do. Now, my young friend here is sanguine. Well, the harvest will come in by and by, and he will be astonished at the result. I would advise him to stop just where he is.

Dr. Dwinelle. Many years ago I had occasion to assist in amputating a limb of a man in a hayfield, and when we got through our case of instruments could not be found. Five years afterwards it was found in the same field, but the storms of summer and winter had decomposed the entire establishment. The case had fallen apart,

and all of the steel instruments were as rusty as possible except the principal cutting instrument, the large amputating knife, which had simply become brown. I could hardly account for this strange phenomenon for the moment, but on looking at the hasp of this larger instrument I found what proved to be zinc soldered on its end. I at once made this application: I found that steel to which zinc was attached would not rust in water or in the mouth. Recognizing this principle, I that day made and introduced jackscrews to our profession. I have yet some of the jackscrews I made at that time. They have been made since by the quantity here in this city and elsewhere, and they are always sure in their effect—they are sure not to rust, so long as the zinc is secure in the little drill-hole prepared for its reception in the instrument. In the course of time the zinc will oxidize out, and we have to replace it. You can procure them from one-eighth of an inch to two inches long.

Since this discussion has come up to-night it occurred to me that, if people must use steel screws, why wouldn't it be well to drill a hole in some part of them and load with zinc? But why use them at all? We can make an alloy of iridium and gold, or platinum and gold, and have a material almost, if not quite, as strong as steel, and one that will not rust under any circumstances.

The President. Several years ago I broke a steel instrument in the root of a tooth, and failing to get it out by any means that I had at hand, finally in despair gave it up and filled the cavity with a temporary filling, thinking that I would keep the tooth under observation. It was an ugly broken point, and I did not know whether it had been forced a little through the end of the root or not. Sometime after that—perhaps a year or more—I took the filling out to see what I should discover, and I found, somewhat to my surprise, the same condition that Dr. Howe described. With almost no difficulty at all I removed with a magnetized wire what was left of the steel instrument. I then washed out with the syringe what was still left of the instrument, which was in the form of an oxide. Since that time I have taken advantage of that knowledge to remove finally from the roots of teeth instruments broken in that way. I have one patient coming next week in whose tooth I broke an instrument some six weeks ago. I filled the tooth with an oxide of zinc filling, and then pierced a little hole through it to allow oxidation to go on more rapidly. I shall be curious when he comes to see what effect six weeks will have upon that broken instrument.

Dr. Rich. If you had put a little salt up into the root it would have turned it into oxide of iron very quickly, so that it could be washed out.

Dr. Clark. Ten or fifteen years ago I had a similar experience.

I had broken off an instrument in a tooth. An incident suggested to me the use of salt. I adopted it, and in twenty-four hours I was able to remove the broken instrument. Now, wherever I break an instrument off it only takes me from twelve to twenty-four hours to dissolve it out.

Adjourned.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, April 7, 1883, at the office of Dr. Essig. President Essig in the chair.

A paper was read by Dr. S. E. Gilbert on "Plaster Impressions," as follows:

I regret that so many of the profession have discarded plaster in part, if not wholly, for taking impressions. This is the only material that will afford a perfect impression in difficult cases, with all the others an after-carving being necessary. The excuse given for not employing it is that plaster is very objectionable to patients. I find that by manipulating plaster with care and neatness few object to its use, particularly if patients are made to understand that a correct impression is required and that the result is best obtained by using it. They are pleased to know that plaster can be used but once, and that, therefore, it is clean. With wax or with modelling composition they are not so sure of this cleanliness, and often look upon such materials with distrust. The reason that patients object to the use of plaster is more often the fault of the operator than of the material. Of course, objections will be made if the pasty mass is allowed to run back into the throat, or when the patient's face, hair, or clothes are smeared, but these mishaps are not necessities for the taking of either partial or full impressions. More skill is required in using plaster than in the employment of wax or modelling composition, but when an impression is obtained with the former the operator is repaid in having one which he knows to be perfect.

In taking an impression, first examine the mouth with a view to the selection of a cup adapted to the case. If it is a full upper with a shallow arch, the cup is to be flat. If the muscles extend far down upon the alveolar ridge, the sides of the cup are to be correspondingly low; or if the arch is high and the ridge prominent, the cup is to be elevated in the center and around the edges. To prevent the plaster's extending too far back, build a rim of wax across the heel of the cup; place this in the mouth, allowing the wax to rest gently upon the posterior edge of the hard palate. Mix the plaster free from air-bubbles, and place a sufficient quantity in the impression-cup,

being careful not to overload it. Dry the palatine portion of the mouth with a napkin, and place a little plaster in the high part of the arch, working it into position, and taking care to exclude all air-bubbles. The cup and plaster are now gently forced into place, allowing the posterior portion to be pressed up slightly in advance of the anterior part. This forces the plaster where it is needed, namely, at the sides and in front. The cheeks and lips are pressed against the material, which, after setting, is removed and the cast run.

In partial cases it is more difficult to obtain a good impression, many making it more so by reason of removing the plaster before it has set, their desire being to obtain an impression without fracture. This may be done, where there are no undercuts or dovetails by allowing the plaster to set so that it will fracture without crushing; but if there are any undercuts it is altogether wrong, as there are comparatively few partial impressions that can be removed whole and be at the same time correct. The plaster should be hard before any attempt is made at its removal. Take, for instance, a lower case where there is partial anchylosis of the articulation, the teeth standing in different directions, forming dovetails and undercuts. Select a suitable cup and fill with a sufficiency of plaster. Insert this into the mouth. Force the cheeks and muscles out with the fingers, gently working the cup into place. When this is done and while the plaster remains soft, press the cheeks and lips against the paste, allowing time for hardening; carefully remove the cup, leaving the plaster in the mouth. With a thin-bladed knife cut a line through the plaster down to the masticating surfaces of the teeth, and where these are absent cut a little deeper. Insert the knife-blade in this line on one side and carefully twist it. This breaks the plaster away from the outside of the arch. Repeat the same on the opposite side, and, following this in front, that remaining on the inside of the teeth is pressed inward with the finger, when it will fracture and is easily removed. Perhaps, however, some of the plaster will cling closely between the teeth that form the dovetails. This is to be fractured with a knife, and removed before the attempt is made to separate that upon the inside of the teeth. After removing the impression, the pieces are to be replaced in the cup according to their original position, care being taken that no particles of plaster are in the way to prevent absolute apposition. When all are in place and the cast run, we feel certain that we have an impression that is in every way all that is to be desired. For partial cases, the teeth being loose, an impression may be taken as follows: first, obtain an impression in wax; run a cast in this and fit a wax cap over the teeth, so trimming that the necks of the teeth and gums are exposed.

Place this in the mouth and take an impression in plaster after the usual manner. Remove when hard, and a perfect impression of the soft parts and necks of the teeth will be found to have been secured, and with little or no inconvenience to the patient.

In partial uppers where there are enough teeth remaining to retain the plaster, place the paste in the mouth, filling it even with the masticating surfaces of the teeth. This leaves the cup free; but in some cases, especially when the teeth are absent, it is necessary to place a little plaster around the edges of the cup. Build a thin rim of wax at the heel of the cup, which is passed into the mouth beyond the plaster, then drawn forward and gently pressed into place, causing the heel to go up first, thus forcing the plaster out where it is needed, and not into the throat. A case in practice was as follows: The central incisors and molars leaned inward; the molars upon one side tipped forward and upon the opposite side they leaned backward. The plaster and cup were inserted as described above. After the impression had set hard, the cup was removed, leaving the plaster (and wax that had been placed across the cup) in the mouth. With a pair of foil-pliers the wax was removed, as also what plaster had been forced over it. This left the posterior portion of the mouth free. The line was now cut over the teeth after the manner described in the lower case. The knife-blade was next inserted in the line cut over the masticating surfaces of the teeth upon one side, and by twisting it the plaster was fractured to the line opposite the cuspid. The piece thus secured was removed; then the opposite side and front were treated in the same manner. The palatal portion still remained fastened with a strong dovetail. With the knife a line was cut about a quarter of an inch from the molars and nearly through to the hard palate, beginning back and coming forward to the cuspid; the knife-blade was then placed in the crevice and twisted enough to fracture the plaster. This piece was taken out, and the remainder removed by inserting an instrument (bent at an acute angle, and flattened) between the plaster and palate, drawing it down gently.

Familiarity with plaster as an impression-material cannot fail to recommend it as an agent well adapted to the ends desired. That it requires a varied experience is clear enough to all attempting its manipulation. It will, however, repay many times the cost and labor of overcoming the difficulties associated with its use.

Discussion.

Dr. Bonsall. I do not believe in capping molars with wax previous to taking a plaster impression, as suggested by Dr. Gilbert. I have

taken them in this way, but the practice is wrong; it is impossible to get a perfect impression, as the wax will drag around the teeth in removing it. To make a perfect denture we must have an accurate impression of the necks of the teeth. Some patients have very sensitive mouths—so much so, that it is impossible to use a napkin in filling a tooth. May I ask Dr. Gilbert how he would manage in such a mouth to take a plaster impression?

Dr. Gilbert. I would build a thin rim of wax across the heel of the cup, and by carrying this up in advance of the anterior portion the plaster is forced to the front and sides.

Dr. Register. When an atmospheric plate is required, I do not think plaster gives us the best results, it merely taking an impression of the hard and soft tissues as naturally found. Thus, if the membrane is universally hard, or soft only in small, isolated spots, all will be satisfactory; but in the majority of cases the tissues are firm in one part of the ridge or palate, and soft and yielding in another part. In such cases pressure is resisted by the former, and the soft membrane is compressed as the air is exhausted, causing an unsatisfactory impression. In these cases we want something which will harmonize the whole surface, so that when the air is exhausted the plate will press equally upon the hard and soft tissues, thus preventing the possibility of tilting. For this reason, an exact negative of the mouth is not always to be devoutly wished for. This has been demonstrated in the successful use of mineral plates that have been adapted by the disk to approximate a perfect atmospheric denture. When clasps are to be used I do not think a discrimination necessary, other than to use that which is easiest and most comfortable to your patient, as good results for these cases can be gotten from any carefully prepared material. In my own practice I have used exclusively for several years the modelling compound, with universally good results, preferring the medium and hard, and using the former on hard palates and the latter on soft ones.

Dr. Wood. In cases of very sensitive mucous membrane, I prevent spasms of the stomach when taking impressions by placing the patient straight up in the chair or leaning forward, so that the saliva will run out of the mouth. This relieves the patient of much anxiety, and frequently prevents retching. In taking impressions in plaster, the cup should first be placed against the anterior part of the mouth and gradually brought up to the posterior part, in order to expel the air and prevent bubbles. In the case mentioned by Dr. Gilbert, where the teeth had large crowns and small necks, to get a good impression I would first take a wax impression (having the wax well secured to the cup by melting the adjoining surface), then cut out the wax around the impression of each tooth, the cavities

representing in shape inverted cones. Fill these cavities with plaster, not too thick; place a thin coating over the balance of the impression and reinsert in the mouth, pressing quickly and thoroughly to place. When the impression is removed, the larger masses of plaster will remain about the teeth, but can readily be fractured and fitted into their proper places.

Dr. Gilbert. In sensitive mouths it is sometimes necessary to give bromide of potassium half or three-quarters of an hour previous to taking the impression. This generally prevents retching.

Dr. Jas. Truman. Impressions may be taken well with almost any of the materials employed for this purpose, provided care is used in the manipulation. Plaster, wax, modelling compound, and even gutta-percha are efficient under certain conditions; but judgment is required with any or all of them. A professional acquaintance used the latter almost exclusively and with remarkable success. I have made use of plaster for the past thirty years, and, as a rule, prefer it to other materials, especially in soft conditions of the mucous membrane. Plaster can be used so soft as not to materially disturb the normal position, while any of the others will press the parts out of place and act as a spring to force the plate down, rendering it very difficult to obtain permanent adhesion by atmospheric pressure. For the past few years I have almost abandoned plaster for lower impressions, as the modelling compound gives very satisfactory results, and without the annoyances consequent in the use of either plaster or wax; but it should be kept in the mouth until hard enough to be moved without danger of change in form.

Dr. Guilford. I was much pleased with Dr. Gilbert's paper. It was clear, concise, and practical. The subject is the most important one in the whole range of prosthetic dentistry. The material for and methods of taking impressions are many. Gutta-percha, so largely used and recommended by English dentists, has found but little favor here, and beeswax, once so generally used, is employed by comparatively few dentists to-day. The introduction of the modelling compound has almost marked a new era in the taking of impressions. When the quality is good, and it is properly manipulated, and not taken from the mouth before it is entirely hard, the result is usually very satisfactory. It combines the plasticity of wax with the sharpness and hardness of plaster. For the taking of difficult partial impressions it is certainly very superior. Plaster, of course, takes the sharpest and most perfect impression, and wherever it can be used without too great discomfort to the patient or annoyance to the operator it should be employed. For one, I have never attained such proficiency in its use as to lead me to take all impressions with it, as some dentists do. In all normal and in most partial cases I use

and prefer it, but in difficult partial cases I generally use the modelling compound. We can often use a combination of two materials, such as plaster and wax, with the happiest results. The well-known method of taking an impression in wax, trimming a layer from its surface and scoring it, and then reintroducing it with soft plaster on its surface, is a most excellent one. We get a sharp plaster impression which is removed from the mouth without difficulty. Another good plan is to put pieces of wax on the cup at points corresponding to the natural teeth remaining in the mouth. Then, keeping the wax warm and plastic, we mix our plaster and fill the balance of the cup with it. The teeth enter the wax and the balance of the impression is taken in plaster. This has the advantage over the previous method of not allowing the plaster to get into the depressions made by the natural teeth in the wax. In cases, too, where the oral portion of the alveolar ridge has become soft and flabby from previous wearing of a partial plate, and the balance of the ridge remains normally hard, I combine the wax and plaster by first taking a wax impression and not trimming it any where the ridge is soft, but at all other portions, and retake in plaster. By this means the soft part is taken under pressure, with the balance in a state of repose. I feel that I thus get results that I could not get by the use of any one material alone. In my teaching I try to emphasize the point that in selecting the material for an impression we must use our judgment and be governed by the conditions of the case.

Dr. Maxfield. I find, in making partial plates on a cast made from a plaster impression, which had to be broken in order to remove it from the mouth, that I have to do considerable trimming to the plates to make them go into their places. I have been more successful in such cases with the modelling compound, as the amount it draws in removing from the mouth is an advantage, in that a plate must be so made in order that patients shall have no trouble in removing it when they desire. For full sets I much prefer plaster, as with nothing else can I get such a perfect fitting plate.

Dr. Buckingham. It is difficult to adopt any certain rule for taking impressions. In the majority of cases plaster is the most certain; we can get the rugæ more perfectly with it than with any other material. A good impression may be obtained with plaster by first taking a wax or modelling-compound impression; then cutting away so as to have the impression very little larger than the plate is to be, and then using a small quantity of plaster the consistence of cream. For partial cases, I sometimes use the modelling compound, but with this substance care must be taken to prevent its warping. But no matter what material is used, we can never get two casts alike of the same mouth from different impressions taken

at the same sitting. In many cases it is a very difficult operation to take a good impression.

Dr. Tees. I must go upon the record as one who uses nothing but wax for taking impressions. I discarded plaster several years since, after using it for upwards of ten years. I found its use not only unpleasant to myself but to my patients. I think more credit is given to it than it deserves. By wax I mean pure yellow beeswax, such as is sold at the dental depots for the purpose, and which should be properly heated; and not the oily, dirty stuff that has been lying around the laboratory for months and been spoiled in over-heating. Students should be taught to take good impressions with all the materials in use, and not be restricted to plaster and forbidden to use anything else.

Ambler Tees, D.D.S., *Recording Secretary.*

IOWA STATE DENTAL SOCIETY.

The twenty-first annual meeting of the Iowa State Dental Society was held at Iowa City, May 1, 2, 3, and 4, 1883, Prof. A. O. Hunt, of Iowa City, president, in the chair.

The Iowa State Board of Dental Examiners was in session at the same time and place examining candidates for licenses to practice dentistry in Iowa.

The following were elected officers for the ensuing year: E. E. Hughes, president; F. M. Shriver, vice-president; J. B. Monfort, secretary; J. S. Kulp, treasurer.

The society adjourned to meet at Council Bluffs the first Tuesday in May, 1884.

J. B. Monfort, *Secretary,*
Fairfield, Iowa.

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

The annual meeting of the South Carolina State Dental Association was held at Aiken, S. C., April 17, 1883. The meeting was largely attended, noticeably by the young men of the profession.

The following officers were elected for the ensuing year:

B. H. Teague, Aiken, S. C., president; T. G. Thompson, Abbeville, S. C., 1st vice-president; W. P. O'Neill, Charleston, S. C., 2d vice-president; A. P. Johnston, Anderson, S. C., cor. secretary; G. F. S. Wright, Columbia, S. C., rec. secretary; R. Atmar Smith, Charleston, S. C., treasurer.

The next meeting will be held at Spartanburg.

PITTSBURG DENTAL ASSOCIATION.

The ninth annual meeting of the Pittsburg Dental Association was held the first Tuesday of May, 1883. The following officers and delegates were elected. Dr. F. A. Reinhart, president; Dr. H. L. Reinecke, vice-president; Dr. W. H. Fundenberg, secretary; Dr. W. A. Lee, treasurer; Drs. W. F. Fundenberg, Williams, and Goshorn, censors; Drs. Diederding, Diehl, Reinecke, Reinhart, and W. F. Fundenberg, delegates to American Dental Association; Drs. Goshorn, Troth, England, Williams, and Naylor, delegates to Pennsylvania State Dental Society.

W. H. Fundenberg, *Secretary.*

NORTH CAROLINA STATE DENTAL ASSOCIATION.

The North Carolina State Dental Association held its annual meeting at Morehead City, N. C., June 12, 13, and 14, 1883. The following were elected officers for the ensuing year: Dr. W. H. Hoffman, Charlotte, N. C., president; Dr. J. H. Durham, Wilmington, N. C., 1st vice-president; Dr. B. H. Douglass, Asheville, N. C., 2d vice-president; Dr. T. M. Hunter, Fayetteville, N. C., secretary; Dr. J. W. Hunter, Salem, N. C., treasurer.

T. M. Hunter, *Secretary.*

AMERICAN DENTAL ASSOCIATION.

The twenty-third annual meeting of the American Dental Association will take place at Niagara Falls, commencing Tuesday, August 7, 1883, at 10 A.M.

Geo. H. Cushing, *Recording Secretary.*

The Committee on Credentials and the Treasurer will be at the place of meeting at 8 A.M., Tuesday, at which time it is hoped the members and delegates will present their credentials and pay their dues, as far as possible, before the hour for the regular meeting.

The afternoon of Tuesday will be set apart for the meeting of the different Sections to enable them to complete their reports to be presented to the general association.

J. N. Crouse, *Chairman Executive Committee.*

AMERICAN DENTAL CONVENTION.

The American Dental Convention will hold its next annual meeting at Saratoga Springs on the second Tuesday in August, 1883. A large attendance is expected, and quite a number of interesting papers are promised.

A. C. Rich, *Secretary,*
Saratoga Springs, N. Y.

SOUTHERN DENTAL ASSOCIATION.

The Southern Dental Association will hold its fifteenth annual session in Atlanta, Ga., July 31, 1884. The dental profession are cordially invited to attend.

J. P. Holmes, *Correspondiny Secretary*,
Macon, Ga.

NOTICE TO STATE BOARDS OF DENTAL EXAMINERS.

There will be held at the Cataract House, Niagara Falls, on Monday, August 6, 1883, at 2 o'clock p.m., a meeting of all the State Boards of Dental Examiners, for the purpose of perfecting the organization of a National Association of Examining Boards. It is hoped that every Board will be fully represented.

Geo. H. Cushing,
Secretary of Conference held at Lexington, Ky.

NEW JERSEY STATE DENTAL SOCIETY.

The thirteenth annual session of the New Jersey State Dental Society will be held at the Coleman House, Asbury Park, N. J., commencing at 10 o'clock, Wednesday morning, July 18, 1883, and continuing three days.

The Board of Examiners for the examination of candidates for license to practice will meet at 10 a.m., July 17; candidates will report to the secretary, room 99. Hotel rates reduced from $4.00 to $2.50 per day to the profession. Time from New York and Philadelphia 2 hours. The profession generally are cordially invited.

Chas. A. Meeker, *Secretary*,
Newark, N. J.

CENTRAL PENNSYLVANIA DENTAL ASSOCIATION.

The Central Pennsylvania Dental Association will hold its tenth annual meeting on Monday evening, July 30, 1883, at 7.30 o'clock, in the dental rooms of Dr. W. B. Miller, Altoona, Pa.

J. D. Geissinger, *Recording Secretary*, Bellefonte, Pa.

MAINE DENTAL SOCIETY.

The eighteenth annual session of the Maine Dental Society will be held in Portland, Tuesday and Wednesday, July 17 and 18, 1883.

Dana W. Fellows, *Secretary.*

PENNSYLVANIA STATE DENTAL SOCIETY.

The fifteenth annual meeting of the Pennsylvania State Dental Society will be held at Cresson, Pa., commencing July 31, 1883, and continuing three days.

Rates at the Mountain House reduced from $4.00 to $2.50 per day. Excursion rates on all the main lines of railroads in the State. This resort is situated on the top of the Allegheny Mountains. The Mountain House, which has been rebuilt, will accommodate about 1,100 guests. The lawns, gardens, and groves, covering four hundred acres, with magnificent scenery and springs celebrated for their waters, make this resort one of the most delightful in the country.

For information, address, inclosing stamp,

W. H. Fundenberg, *Corresponding Secretary*,
No. 330 Penn Ave., Pittsburg, Pa.

EDITORIAL.

DENTAL LEGISLATION IN MISSOURI.

The following is the text of an act to regulate the practice of dentistry in the State of Missouri, passed at the recent session of the Legislature of that State. This act differs from all others in force of which we have knowledge in that it requires the possession of a diploma from all who hereafter engage in the practice of dentistry in the State. This requirement does not, of course, apply to *bona fide* practitioners within the State at the date of its enactment:

"*Be it enacted by the General Assembly of the State of Missouri, as follows:*

"Section 1. It shall be unlawful for any person to practice dentistry or dental surgery in the State of Missouri without first having received a diploma from a reputable dental college or a university duly incorporated or established under the laws of some one of the United States or of a foreign government: *Provided*, That nothing in section 1 of this act shall apply to any *bona fide* practitioner of dentistry or dental surgery in this State at the time of the passage of this act: *And provided*, That nothing in this act shall be so construed as to prevent physicians, surgeons, or others, from extracting teeth.

"Sec. 2. Every person who shall hereafter engage in the practice of dentistry or dental surgery in this State, shall file a copy of his diploma with the clerk of the county court in the county in which he resides, and in the city of St. Louis with the city register, which copy shall be sworn to by the party filing the same, and the clerk shall give a certificate of such fact with the seal of the county court attached thereto to such party filing the copy of his diploma, and shall file and register the name of the person, the date of filing, and the nature of the instrument, in a book to be kept by him for that purpose, and as a compensation for his services, the said clerk for filing and registering the same shall receive a fee of one dollar, to be paid by the person filing the diploma.

"SEC. 3. Every *bona fide* practitioner of dentistry or dental surgery residing in this State at the time of the passage of this act and desiring to continue the same, shall, within ninety days after the passage of this act, file an affidavit of the said facts with the clerk of the county court of the county in which he resides, or with the city register of the city of St. Louis, if he resides in the city of St. Louis; and the said clerk or register, as the case may be, shall register the name of, and give a certificate to, the party filing the affidavit, in like manner and of like effect as hereinbefore provided, and for such services shall receive a fee of one dollar, to be paid by the party filing the affidavit.

"SEC. 4. All certificates issued under the provisions of this act shall be *prima facie* evidence of the right of the holder to practice under this act, which right it shall be incumbent upon the holder to prove under all prosecutions under this act.

"SEC. 5. Every person violating any of the provisions of this act shall, upon conviction thereof, be deemed guilty of a misdemeanor, and be punished by a fine of not less than twenty-five, nor more than two hundred dollars for each offense; and all fines so collected shall belong to and be paid into the common-school fund of the county where the offense was committed.

We have also received the text of the Michigan law. It will appear in the August number.

BIBLIOGRAPHICAL.

THE DISPENSATORY OF THE UNITED STATES OF AMERICA. By Dr. GEORGE B. WOOD and Dr. FRANKLIN BACHE. Fifteenth edition, rearranged, thoroughly revised, and largely rewritten. With illustrations. By H. C. WOOD, M.D., JOSEPH P. REMINGTON, Ph.G., and SAMUEL P. SADTLER, Ph.D., F.C.S. 8vo., 1928 pp. Sheep. Philadelphia: J. B. Lippincott & Co. Price, $8.00.

It is just a half century since the Dispensatory of Drs. Wood and Bache was issued. It has now reached its fifteenth edition. With each issue it has been revised, corrected, and improved; but the changes in the volume before us are more numerous and more valuable than in any previous edition. The original plan of its founders has for the first time been carried out in the employment of three editors, representing pharmacy, chemistry, and therapeutics. The work bears evidence of very careful and very thorough preparation. Among the changes which distinguish the present from former editions are the careful calculations by which each officinal formula has been adapted to the use of those who prefer the system of measuring liquids, and the introduction of the pronunciation of officinal titles. Another very convenient change is the collation of the various articles of the materia medica alphabetically, instead of as formerly under two headings. During the six years which have elapsed since the publication of the fourteenth edition, many new articles have been added to the materia medica, and great progress

has been made in therapeutics; these have necessitated a rewriting of a large portion of the volume. The index contains over sixteen thousand titles—about five thousand more than in the previous edition. This volume, representing as it does the latest achievements in its several departments, may be pronounced a complete and reliable encyclopedia of materia medica, chemistry, pharmacy, and toxicology.

The Practitioner's Ready Reference Book: A Handy Guide in Office and Bedside Practice. By Richard J. Dunglison, A.M., M.D. Third edition, thoroughly revised and enlarged. Octavo, 529 pp. Philadelphia: Presley Blakiston, Son & Co., 1883. Price, $3.50.

The first and second editions of this book were favorably noticed in this journal. The necessity for a third edition within six years is satisfactory evidence of the appreciation of the author's labors. It contains a mass of information in a compact and orderly form, embodying in a single volume facts and suggestions for which one would otherwise be compelled to search through many voluminous treatises. A new list of its contents would occupy more space than is at our disposal. Indeed, the subjects now introduced for the first time are too numerous for recapitulation. It is a book which any one at all interested in medicine might find occasion to turn to almost hourly. The volume has found a place beside the United States Dispensatory in our library, and is worthy of the position.

Annuaire Général des Dentistes, 1883-1884. Publié sous le patronage de la Société Syndicale Odontologique de France. Augmenté d'un Mémorial Thérapeutique du Médecin Dentiste. Par le Dr. Andrieu. Paris, 6 rue Mogador.

We have received a copy of the above French Annual for 1883-1884. It contains a list of dentists practicing in Paris and in the several departments of France, and also in Belgium, Switzerland, and Algiers; an account of the formation of the Odontological Society of France and report of its labors; a sketch of the proposed law to regulate the practice of dentistry and dental apprenticeship in France; therapeutic memoranda for dental surgeons; a list of periodicals in medicine and dentistry published in France, with a partial list of foreign journals, bibliographical references for dentists, physicians, etc.

Zahnärztliche Belehrungen für Saien. von Adolf Petermann, Frankfurt a.M.

This pamphlet of twenty-four pages by the compiler of the "Zahnärztlicher Almanach," belongs to the class of publications intended

for the instruction of the general public, and, in this respect, fulfills all that is required in such a work.

The reception is acknowledged of the reports of meetings of the Dental Society of Frankfort, for the years 1881 and '82, also copies of the "Almanach" for the years 1880 and '81, containing admirable portraits from steel engravings, of four of Germany's distinguished dentists; Rottenstein, Wienecke, Mühlreiter and Overman.—T.

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

What is the trouble and what should be done in the following case? In January, during very severe cold weather, a gentleman fifty-three years of age presented himself at my office to have the right superior wisdom-tooth removed, which was badly decayed and somewhat loose, standing alone—the molars and bicuspids having been extracted some time before. The tooth was easily removed, without fracture of tooth or process, and the man returned to his home, twelve miles in the country. About one month afterwards he came back, wanting the lower right wisdom-tooth extracted, saying that he guessed he had been mistaken in the tooth, as he had been suffering about the same. As the tooth was badly decayed, I removed it.

He came back a few weeks ago stating that he had been suffering severe pain from the place where the first tooth was extracted; that the gums had never healed over there; that he had been several weeks under treatment by his physician for neuralgia; that he could do nothing for him, and had advised him to come to me. I then examined and found, as he had stated, an opening where the tooth was removed down to the bone. I carefully examined it, but could detect no indications of detached or diseased bone; the parts seemed perfectly healthy. I thoroughly scarified the parts, scraped the bone, dressed it, and prescribed systemic treatment. As this seemed to give him no relief, he put himself under the care of another M.D., who after several weeks' treatment has brought him back to me no better than at first. What should be done?—Robt. A. Todd.

A child, eight years of age, was brought to my office by its mother, and on examining its mouth I found the four incisors above and below missing; but the other deciduous teeth and the sixth-year molars were regularly and solidly fixed in the arches. On inquiry, I learned that the child had never erupted the incisors, and had rachitis or rickets. Why are the teeth missing and what is best to be done? Will the second set be erupted, or are the germs of both sets entirely destroyed by the disease? I found further that this boy had a brother twelve years old, who has never walked but has all his teeth. From what I can ascertain from the mother, the trouble arose from syphilis before the birth of the children.—J. W. G.

A Lady who has recently recovered from an operation (for the extirpation of a sarcoma, resulting from the mal-extraction of an inferior dens sapientiæ) involving the removal of the right side of the lower jaw, from the second bicuspid to the

angle, is desirous of obtaining an artificial appliance. In place of the missing bone nature has supplied a cartilaginous structure, but the jaw has been contracted obliquely inward to the extent of half an inch or more, preventing the occlusion of the greater portion of the masticating surface of the teeth. Under traction the parts are easily restored to normal position. Can a correct impression be taken in such a case, and a plate be made that would retain the parts so as to obtain occlusion with the upper teeth in mastication? What would be the best material for a plate, and the best method of attachment? I would be very thankful for practical suggestions.—L. MANKER, *Red Oak*, *Iowa*.

R. Y. H., in the DENTAL COSMOS for March, asks why one side of the mouth should have a fungous growth from wearing a rubber-plate when the other was healthy, and what treatment should be adopted after the failure of excision and the application of phénol sodique and nitrate of silver, to effect a cure. Judging from his description, I should think the fungous growth on one side was caused by the rim going too high on that side, and that trimming the rim would be better than trimming the fungous growth. I have seen cures follow trimming the rim. —W. E. DRISCOLL.

IN answer to H. R. in "Hints and Queries" (May number of the DENTAL COSMOS), it is to be said that the history of the case is not given in detail to serve as data for a diagnosis of the cause of the absorption, which is said to be continuing, and such continuance may have a cause wholly separate from, and without relation to the cause of the primary absorption. The normal absorption of the alveolus, after the teeth are extracted, continues for a longer or shorter period, averaging, perhaps, a year; but there are cases of abnormal absorption (as, for instance, in some forms of pyorrhea alveolaris) where the process is almost entirely wasted, over a tract embracing, it may be, the incisors and bicuspids; so that, when at last the tottering teeth are removed, the spongy and thickened gums flap together and unite to form a gristly roll similar to that described by H. R. There are also cases where the normally complete absorption is followed by a further shrinkage, which has been ascribed to the misfit or to the quality of the artificial plate worn by the patient. In H. R.'s instance it may be supposed that the black-rubber plate has occasioned the abnormal absorption, but the conjecture would be based upon a theory concerning non-metallic plates, and especially vulcanized plates, which, while affording a theoretically plausible explanation, has yet no verification in clearly observed and recorded facts, so far as we are aware. Possibly a connected history of the present case would throw light on the subject.

H. R. may obtain a good impression by the use of plaster mixed rather thin, and which is allowed time to set hard, or by the judicious use of Modelling Composition No. 1, applied when quite soft, after an instant's immersion in cool water, steadily holding it in the properly-adapted impression cup until firmly set.—H. S. W.

IN the February number of the DENTAL COSMOS, C. asks how to cure his son of sucking his tongue. Having had the same trouble, I sympathize with him, as I shall carry the marks of the evil through life—a protruded upper jaw, with a space between the central and lateral half the width of the lateral, or more. I have found that when the teeth are articulated properly there is no possibility of doing so; therefore, I should say, employ a bandage such as is used in fracture of the jaw to hold the teeth in position at night. That would also prevent "mouth-breathing," which is so strongly condemned in the June nnmber of your journal.—E.

A New Use for the Campbell New-Mode Heater.—It has been my good fortune to have had the opportunity of becoming thoroughly familiar with this ingenious and valuable apparatus, and my equally bad one to have failed, for a number of years in cheoplastic work, until it occurred to me to utilize the New-Mode heater for the purpose. Its value as the best means of working celluloid, "goes without saying." It is equally certain that by its use a far better result is obtained in vulcanizing rubber, especially the black or uncolored,—which becomes harder, and is therefore susceptible of a much higher and quicker polish; and what is of far greater moment, the adaptation to the mouth is more perfect and reliable. This I believe is due to the fact that the operation is conducted with super-heated steam instead of bathing the investment in free water. It is true that the use of this machine requires a little more skill and attention than the roasting of peanuts; it is true, also, that only one case can be steamed at a time, though it would be easy to adapt flasks of suitable size so that two could be vulcanized together. To me its especial value is in the fact that in conjunction with my associate, Dr. Sanger, we obtain absolutely certain success in working cheoplasty, Weston's, or Reese's metals. We have just at the moment on hand three under sets; the joints of the blocks are perfectly water-tight; all the delicate lines of the alveolus are faithfully reproduced, and, lastly, we never have such a thing as a checked or cracked block. In order to show the absolute certainty of the method, we have taken a common glass bottle and therein cast a quantity of the metal. The bottle was not fractured. It has been filled up with colored alcohol and shows no sign of leak or of the fluid permeating between the bottle and casting after standing three days.

To those who have seen the beautiful results obtained by Drs. Atkinson and Reese with their cast-gold alloy, and are familiar with their advocacy of the system generally, but little need be said. For directions in manipulation Dr. Weston furnishes useful and practical suggestions, for which I have much pleasure here in rendering grateful tribute.

The majority of the readers of the Dental Cosmos do not probably recollect the introduction of his base-metal many years since by Dr. Blandy. I think he was the first to place the matter in a concise and practical form before the dental profession; but coming as it did just about the advent of vulcanite, but little attention was then accorded his invention; otherwise it would without doubt have occupied an honorable place in dental prosthesis, as in future it will become an absolute necessity to every earnest practitioner in this branch of our art. I unhesitatingly aver that it is as necessary as a plastic filling to the operator. Dr. Sanger and myself feel that we cannot say too much in its favor when used in lower cases, either partial or entire.

I have been interrupted in writing this to see a lady for whom, as a last resource, we adapted a cheoplastic lower set, with an upper of rubber. She has been served by three or four skillful dentists, as well as ourselves, unsuccessfully, one of the difficulties being to secure anything approaching steadiness of the lower plate (the jaw abnormally protruding). She has worn it ten days, and pronounces it phenomenal. The membranes shows no sign of inflammation or excavation. The teeth are perfectly steady, and mastication is effectually restored. Weighted rubber, or any other substance excepting continuous-gum, has no place in the race with it. To all who have troublesome lower cases I recommend this method, and by means of the Campbell New-Mode they will achieve an absolutely certain result with less trouble and but little more time, than with an ordinary rubber case.—Lawrence Vanderpant, L.D.S., *Brick Church, N. J.*

THE

DENTAL COSMOS.

VOL. XXV. PHILADELPHIA, AUGUST, 1883. No. 8.

ORIGINAL COMMUNICATIONS.

PRESENT SYSTEMS AND THE IMPENDING EDUCATION.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

(Read before the Missouri State Dental Association, at Sweet Springs, Mo., July 11, 1883.)

THE nations of men, ever and anon, as the serried centuries file past in the changeful march of time, find themselves upon the threshold of a new future. The phenomena of an unexpected era, an unanticipated condition of things, loom up before them, but the change advances unimpeded, for change is inevitable and irresistible. It favors neither time, nor place, nor persons; permits no rest, and tolerates no permanence in nature or the affairs of men. All things are subject to the law, and change is everywhere. Old things are passing away to make room for the new, which in their turn shall grow and bloom and fade and pass away. Human institutions enjoy no exception from the operations of this remorseless law, but are ever changing and progressing toward ultimate perfection.

One human institution in which we are much interested, dental education, is also, we hope, through all its changefulness, really advancing toward that ultimate perfection so much to be desired. Some of the changes which have marked the progress of dental education in the past have been abrupt and sudden; others have been insinuating and inappreciable; but many have been influential, and some momentous. Old conditions and influences have passed away and new demands and forms have arisen, making the dental education of to-day a very different organism from that of a generation ago. The differences are largely due to the alterations incident to growth and development and the progress from a lower to a higher plane. The history of this development has been noticed before (*vide* articles in the DENTAL COSMOS upon Dental Education and Science).

As a preliminary step to the consideration of the matter in hand, let us review the varieties of systems, with their varying quantities and qualities of education, which are found in our midst to-day, and which pass under the name of education. We find the genius of education sailing under different banners and presenting itself in a variety of guises, which we will endeavor to briefly notice and classify:

The *first*, then, beginning with the lowest organized species in the *genus* of educational institutions, so called, is the mere diploma mill, —the sheepskin shop,—which is, in fact, in no sense educational at all, but exists as a mere libel upon the fair name of education. All respectable practitioners of the profession unite in condemning and execrating this excrescence, and in denouncing and ostracising its perpetrators. There is but one opinion concerning this class of institutions, and they are mentioned but to be condemned. The wheels of the law have been justly set in motion against them, and all men cry, let them speedily be suppressed!

The *second* grade, which may be called a step higher on the moral educational ladder, is the college which grants degrees for "merit alone," without regard to time of attendance upon lectures or instruction of any sort, or, indeed, without any such attendance at all, provided the examinations, so called, are passed. This system is attractive, theoretically, and commends itself to a large body of superficial thinkers and would-be reformers, but practically it is worthless. Theoretically and in the abstract the system seems fair, in that it would reward that large body of well-informed, capable practitioners, prominent in the profession, who are studious, energetic, and worthy men, and who better deserve the distinction of receiving the degree than many who receive it by regular attendance upon lectures and graduation by the colleges. But, on the other hand, when the system is put into practice, it is not the worthy and deserving men who obtain the degree; they do not, as a rule, come forward and apply for it, and if they did, their very modesty and honesty would lead to their discomfiture and undeserved failure before the examiners—*if* the theoretical strictness of examination was maintained. But it is the unworthy pretender who applies, whose lack of knowledge is more than compensated for by his assurance, and he comes out with flying colors—a disgrace alike to the system and to the profession. In addition to the difference between modesty and cheek, as counting for or against success, is the laxity necessary to the success of the system, and the absence of the conscientious application even of its merits. It is this inherent necessity for laxity which condemns the system and renders it impracticable and dishonest. It is easy to reply that, "*If* the 'merits alone' system were conscientiously applied," etc. It is the *if* that con-

demns the system. It is not, cannot be, practically sustained in its theoretical purity. It is not too much to say that it is beyond human power to make it strict, or, indeed, to make any system strict and conscientious which depends solely and alone upon examinations as a test of the ability of the student. Injustice alike to the worthy and the unworthy is sure to result and the honors to be misplaced. In point of fact, the conscientious granting of honorary degrees, without any examinations whatever, is far more likely to be justly performed, and with a more honest and discriminating judgment, than by examinations alone. The merit system presents too many loopholes and too few restrictions to commend it to the approval of the intelligence of the profession as a desirable variety of our educational schemes.

The *third* system is a full step higher in the scale, although bearing a strong family resemblance to the last described. It is that custom which obtains with many colleges even yet, although it is now fortunately becoming obsolete and disreputable, of considering five years' practice or experience in the profession as an equivalent for the attendance upon one course of lectures. The degree is bestowed after attendance upon a course of lectures in the college and the passing of the terminal examinations. This is just as much better than the preceding system as that one course of lectures is better than none at all; and the degree is also truthful in that it certifies to the enjoyment of *some* opportunity, at least, for the acquisition of knowledge. But the one course represents all the scientific training the graduate possesses, and he cannot possibly have been fitted in that brief period for intelligent practice. The stock of intellectual furniture acquired in that limited time must necessarily be small. Of course, this system has the advantage that many of the exceptionally worthy, theoretical cases, *do* attend the one course of lectures and graduate with honor to themselves and their *alma mater*. Thus far the system is right and honest, and the practice sustains the theory. But the ideal cases are, unfortunately, in the minority; and the unworthy—those who are unfit to wear the honors—constitute the majority of the five-years-and-one-course class of graduates. The custom is unfair to those who earn the degree, and it gives birth to most of the graduated quacks. In response to the demands of the reform movement in the profession, it is being gradually abandoned.

The *fourth* system in order is more than a step higher than the preceding, and marks the emergence into the full daylight of conscientious educational work. It is that of requiring attendance upon at least two courses of lectures before graduation and the bestowal of the degree. It imposes the opportunities of two yearly courses

of didactic lectures, clinical and practical teaching, and other scientific instruction in medical or dental colleges where such opportunities are afforded. The degree then assumes that the possessor has been subjected to the best of opportunity, and that he presumably possesses the attainments and abilities required. This system is, of course, more fruitful than the single course of creditable and useful results. The difference is readily noticed between the material the two systems produce. The two-years students, raw and uncouth as many of them are, are better fitted for a successful and honorable career in the practice of the profession than the average practitioner of five or more years' experience, who obtains the parchment after one winter spent in college. The reason is obvious. The two-years men are generally young men who attend college mainly for study and instruction, and that during the plastic period of life, before the mind is cramped by confined habits or the brain becomes stiffened and unimpressionable by age. They there, perforce, acquire habits of study and imbibe of the spirit of investigation which surrounds them, and, if ambitious, will cultivate those habits when they enter upon practice and become honorable and useful members of the profession. But the practitioner, as a rule, goes merely to obtain the degree. He has studied little in his time, has never observed that he needed to study, and protests against the necessity of beginning now. But he must acquire *some* practical knowledge in order to be enabled to "pass," so he crams for that purpose and that alone. He may, perchance, catch some of the inspiring influences and enthusiasm of the atmosphere and associations of college life, and after graduation make a few frantic efforts to study, but his unaccustomed mind fails to respond to the strain, and he soon relapses into his old indolence and becomes the same manner of drone he was before. But, of course, the exceptional, worthy, ambitious practitioner, who esteems it a high privilege to be able to attend even the one course of lectures, whose years of solitary study and investigation have fitted him for acquiring knowledge in this larger field, brings a mind ripe for this crowning honor, and he becomes the worthy recipient of the coveted degree. He alone is the worthy colleague of the two-years student who has spent of his time, means, and strength to acquire instruction and the final certificate of that instruction. They are the worthy recipients of the degree, and it truthfully certifies to their education and preparation for the responsibilities of practice. The ambitious two-years student is the proof of the wisdom of the system. His attainments are broad and varied, and he is likely to carry the impressions of the inspiring associations of college life far into after years, the memory of those days lingering as a perpetual impulse to do better and achieve more.

The *fifth* system, the next higher in merit, and a full step beyond the preceding, is that of dental lectures in connection with medical colleges. We place this system above that of the purely dental colleges, because of the growing sentiment manifested in its favor, and the growing conviction throughout the intelligent and thoughtful classes of the profession that such combined institutions are, on the whole, better able to confer the required scientific education than the purely dental colleges. There has been much discussion and controversy of late years as to the comparative merits of the medico-dental and the purely dental systems, but there is little doubt of the growing favor of the joint system. There is a spreading belief, penetrating even to the mediocre ranks of the profession, that medical colleges are the better qualified to furnish that broader medical knowledge of which the average practitioner stands so much in need; and the advanced minds are beginning to admit that the superior specialists found in the medical schools are naturally better able to furnish complete instruction in the broad, underlying fundamental principles upon which we can alone found a perfect education. The dental colleges provide a special education which, with its tendency toward becoming *too* special, is too prone to ignore that breadth of knowledge necessary to full instruction in the principles. Take anatomy and physiology, for instance; every one knows that the dental student should be as broadly grounded in these principles as the medical student; and yet the dental colleges concentrate their instructions in them to the immediate necessities of the dental surroundings, and the dental student acquires no knowledge of their breadth and general importance. It is this fact that is at the root of the sentiment which is permeating the profession to-day.

For the increasing growth of this sentiment and its more rapid dissemination the profession is, perhaps, more indebted to the Chicago school of reformers, with Dr. Allport at their head, than to any other recent cause. Dr. Allport thus tersely states the facts ("Address on Dental Education," 1881): "Any treatment for arresting disease is legitimately a branch of medicine, no matter whether it be medicines, the surgeon's knife, or materials for filling teeth. All are equally therapeutical agents; but their intelligent use must be based upon a knowledge of anatomy, physiology, pathology, chemistry, and therapeutics; for the human organism is so intimately connected that each part, either directly or indirectly, affects every other part;" and the dental student is bound to know these principles in order to practice his specialty intelligently. Again he says (DENTAL COSMOS, 1883, p. 80), "A knowledge of anatomy and physiology is requisite in the treatment of all classes of disease, and this knowledge must be acquired from medical text-books, which

discuss the principles underlying the general practice of" dentistry as well as medicine, "and it is from these books that we get all the knowledge we have of general principles," etc. But with these suggestions it would seem that the simple and positive propositions (1), that the medical colleges can furnish the best instruction in the basal principles, and (2) that the dental student requires such instruction as much as any other medical man or specialist, should need no defense or elucidation. The dental student requires more than a knowledge, be it ever so thorough, of the anatomy, the organic functions and diseases of the face alone, and he dare not be content with a superficial knowledge of the organism at large with which the face is so inseparably connected in all its functions.

The *sixth* and last system which remains to notice, is the highest which our education has yet attained, and is head and shoulders above everything else within the experience of the profession. We refer to those dental colleges connected with the medical departments of great universities, which require the student to pass a preliminary examination before matriculation and admission. This is universally conceded to be the most prudent, wise, and dignified course of procedure that any system has yet inaugurated, and promising to be the most fruitful of good results. It approaches that ideal system where the perfect standard can be maintained without fear or favor. The reformers and their followers have been urging all the colleges to adopt the method, but there does not seem to be any others which can rise above the *necessity* of turning out graduates. It is greatly to be regretted that the idea is not contagious; but we are in no immediate danger of a revolution from this cause, much as we could wish it. The idea is too radical, too violent, too perilous for the conservative type of colleges. But whether tasteful to the college proprietors of this country or not, whether they ever adopt the innovation or not, the education of the future will necessarily include such a factor in its structure. Preliminary examinations will be a fundamental clause in the constitution of that system which will soon dawn upon us, and toward which we are looking so hopefully. It will be a necessary means toward the selection of the material from which to construct the dental and oral profession of the future. A just discrimination between the ignoramus and the educated applicant for admission to our ranks will be the first step toward the purification of the stream which replenishes our ranks and which will make our future.

Having thus reviewed the systems of dental education which we have with us to-day, and considering well their power for evil or for good, the question arises, What of the future? Like the mound-builder of old mounted on his lookout or the bluff whence he could

see far and near, standing as we do in the last but one decade of the nineteenth century, with the past behind us with its lessons of experience, the present around us with its promises, the future before us with its hopes and fears, we must ask the anxious question, What of the future?

We notice, first, that the education of the future must be developed from, must be the offspring of, the education of the present. A revolution—a radical, sweeping change—is impossible. Something will be developed from one or more of the present systems. The existing confusion cannot last, and it is undesirable that it should. There is "confusion worse confounded" in the present medley, and a discontent with all is growing and shaping until it will bring something definite from out the chaos, or end in an utter nihilism which will destroy all education. Or, perhaps, the conflict might go on until the worst system possible will come out ahead, or the worst results possible will follow. But of this we have no fear. There is a leaven at work which will purify the whole lump and bring order out of chaos. There are some signs of the times which indicate which way the wind blows, and which tell us that a force is forming which will bring harmony at last, and we hope, before it is too late. There will be *unity*, at least; but what form that unity will take, and what will be the impending education toward which we are looking so anxiously, we cannot yet predicate. But the force at work will yield us something definite, which will most probably be a satisfactory solution of the much-discussed problem of education.

The force to which we refer, which will exercise so potent an influence upon the education of the future, is the State Boards of Examiners in States which have and will have laws controlling the practice of dental surgery. This is a factor in the problem of dental education, the introduction of an element into its solution, the importance of which has scarcely begun to be suspected, and whose power to mold the education of the future no one can estimate. It will not be long before every organized State will adopt a law controlling the entrance of young men into the practice of the profession. Then will come the consummation of the tendency to union and harmony manifested by the recent conference of State Boards of Examiners, and a uniform law and a uniform standard will ultimately prevail. In view of this, the organization of the conference of State boards assumes the aspect of being one of the most momentous events, if not *the* most momentous and important occurrence, which has happened in the history of dental education in this country within the memory of the present generation. It is an event so pregnant with meaning as to be second in importance only to the organization of the first dental college in this country. That con-

ference or union of State boards, if it is made permanent, as it undoubtedly will be, is the power which will dictate the education and control the standard of the future. On it the impending education depends for shape and features. It will mold the standard to meet the requirements of the profession, and the power, coming as it will directly from the ranks, will voice the sentiments of the profession. It will raise or lower the standard for admission to colleges and for graduation; it will alter the curriculum and dictate the methods of education in accordance with the popular will, and do all with a ruthless hand, because it holds the keys of admission to the practice of the calling. It will become the practical custodian of all things pertaining to education, and will rule with a pitiless sway, deaf alike to the appeals of starveling colleges and the ravings of fanatical reformers. Why, even now, we read of boards going behind the diplomas of some colleges and examining the possessors of them! The conference will then rule securely and firmly, and it becomes at once apparent that this will be the best possible solution of the vexed question of education. It will cause no suffering except to the unworthy, and do injustice to none. The colleges fit to live can live, but the diploma mills and other workers of iniquity will go down before this irresistible and merciless engine of reformation. The better colleges can doubtless easily conform to the requirements of the conference, for the popular voice of the profession to-day is not unreasonable, and that will be the power which will make itself felt. But if they will not conform they must go down, for from the decisions of this power there will be no appeal. It will be the court of last resort. It will stand upon the merits of the applicants and upon the good of the profession, and will judge without fear or favor. But the fruit of it all will be that we shall be elevated thereby; for the purposes and workings of the conference can only conduce to good. But we are yet unapprised as to the form and features which this new—the impending—education which will be brought about by this new force will assume. We cannot predict, for instance, what will be the standard of admission to practice which will be adopted by the conference; but we can safely assume that the common-sense suggestion will occur to and prevail with these practical men that it shall be low at first, and from thence be elevated gradually. Indeed, it must be low at first, for the standard of the average qualifications of the examiners is itself low. Until the examiners are themselves educated—and this will take time—it is safe to assume that the sliding scale will be employed, which will be at once safe and practical. It is probable, also, that the general aspect of the curriculum required by the conference will be largely dental at the first, with a gradual tendency toward the medico-dental system. In

the lapse of time we will then reach our ultimate destination of fusion with the Medical education, which is the goal and fate of all educated specialties of human medicine. Indeed, to-day, as our education becomes higher it becomes more medical, we acquire greater knowledge of medical sciences, and we become more affiliated with medical men and the medical profession. In view of this, ultimate fusion seems inevitable and is not undesirable. We will then be not less dentists, but more of physicians. In all the pages of progress of recent years we notice that as dentists become more educated they become more medical. They are obliged to refer to medical text-books for their knowledge of the fundamental sciences of our calling, and in becoming broader scientists they become more of physicians. It seems, therefore, self-evident that as a separate branch of the healing art we cannot hope long to retain our independence of the Maternal Medicine.

But whatever the system of the future may be, either immediately or finally, we may assure ourselves that it will be the golden era, and that the dental profession will then be something of which its then members may be proud. It will be something at once thoroughly scientific and thoroughly honest and practical. A radical change from the present cannot be expected—something entirely different from all current systems; any violent change or revolution, in fact, is not humanly possible. It has been wisely said that the law of progress follows the line of least resistance, and in the case of dental education there will be no variation. The line of least resistance is in the direction of the development of what is best and most worth conserving in our present systems, and assuredly *not* in the direction of forcing a revolution and the sudden adoption of radical changes. Great masses move slowly, and great masses of people move exceedingly slow in the direction of reform. They must be educated in the theory of right-doing, and then must be coaxed to practice it; but they cannot be forced. So it is with the dental profession. It has been educated in the theories of right education after years of preaching and teaching by the reformers, and now has begun to move. The movement is in the direction of least resistance—the modification of present systems and the development therefrom of something better. It will lead to the new education which will be something higher and purer than anything we yet know. The power through which the popular will of the profession will be manifested can be trusted to do its duty honestly and thoroughly. The conference of State boards will dictate the impending education.

CRYSTAL GOLD.

BY J. F. P. HODSON, D.D.S., NEW YORK.

(Read before the First District Dental Society, State of New York.)

MR. PRESIDENT AND GENTLEMEN:

The many and grave misapprehensions existing in the minds of men in the profession everywhere in reference to the nature and manipulation of crystal gold, as evinced in the numberless letters of inquiry which have been for some years referred to me for answer, and obtaining as well among those of my professional brethren with whom I have more immediate and personal association; together with the much repeated urging from many quarters that I do so, have conspired to lead me, rather hesitatingly, to make some practical deductions from my long experience in the exclusive use of this beautiful form of gold the subject of my paper this evening. The good work done by Dr. William H. Dwinelle in this direction when he introduced the gold to the profession thirty years ago, the fine operations which he performed, and the (at that time) wholly new system of restorations in gold which he taught were possible with this gold, all seem to have been forgotten by the older generation of operators, and to have never been heard of by the new. The paucity of literature upon this subject since that time is probably greater than that written upon any other important dental material, and most of those who have discoursed upon it have seemed to me to have been strongly imbued with some of the worst and most hurtful of the misconceptions of which this paper aims to suggest the correction. Crystal gold has been neglected, except by those who have come to know it, and have learned to love it well. It has even fallen into disrepute because, like amalgam, it is *an easy material with which to make poor stoppings*, and so, like amalgam, "fell into the hands of the Philistines;" and last, but not by any means least, the gold itself has been so immensely changed for the better as to be scarcely recognizable as the same material. All urge the belief that it is high time that such a paper be written.

As a general basis for, as well as introduction to, the observations which I shall offer for your consideration in the premises, I may say that I (and I think that I may safely speak also for my cöoperators in crystal gold and say we) find in this material all the good qualities that are so highly extolled in other forms of gold, and some in addition which they do not possess; and I have no hesitation in affirming not only that operations can be and are regularly and continuously produced with it that cannot be surpassed by those produced by the employment of any other form of gold, but that they are in some respects even superior; the most notable among these

excellences being, in the manipulation, the splendid combination of the qualities of the most ductile soft foil with those of cohesive foil; the operator's ability to pack it so much more delicately against friable and thin enamel walls than he could foil; entire absence of condensed points or edges, a disadvantage which must always obtain more or less with all methods of using cohesive foil; and, in the finished operations, a steel-like hardness of surface which retains its smooth finish well, and is so especially excellent for withstanding the battering force of mastication.

It seems to be the general supposition in the profession that crystal gold proper has something in common with other so-called crystal golds that have been in the market for some years. *It has nothing whatever* (except, indeed, such as a painting and a chromo might possess), the microscope showing this to be made up of perfect fern leaves in gold, interlaced in every direction, and which mat together into perfect solidity under the condensing instrument; while all others that I have ever examined have been an amorphous mass of granular and dusty particles, having no organization whatever, and upon which I would never for a single instant think of founding a practice and reputation as I have upon crystal gold.

I have understood it to be another general supposition among dentists (I had almost written superstition) in connection with this gold, that it is likely after a time to turn dark in the mouth. I have to reply to this, that if gentlemen mean that a dark appearance is transmitted through the enamel after filling, it is certainly in consequence of their having manipulated this material as though it were amalgam and not the cohesive gold which it is, and inasmuch as the fern-leaf crystals never slide over each other like the granules of amalgam, they have consequently wholly failed to properly consolidate the stopping against the walls of the cavity. Surely a leaky and uncondensed stopping is hardly to be attributed to the form of gold employed. If I, myself, failed in any operation with crystal gold, I should certainly consider the failure to be in *me* and not in the gold. Possibly the gentlemen may refer to a legend—and general prejudice founded upon it—handed down from and referring to a time previous to twenty-five or thirty years ago, when the gold was produced with mercury, and not as *ever since that time* by electrolysis. This proposition, of course, answers itself. Finally, on this point, if discoloration of the exposed surface of the stopping is meant, I have to reply: 1st. That I cannot imagine anything purer or more literally free from every contaminating thing than is crystal gold as supplied to us. It is precipitated, or more properly, perhaps, grown up from its acid solution by electrical action, and the (at this stage) loose and floculent mass afterward washed by a gushing stream of

water projected through it continually for *many hours*, somewhat similar to the manner of treating paper pulp in the engine vats in the manufacture of paper; after which it is caked, and then goes to the muffle for a red-heat. Can one imagine any beaten gold to surpass —even equal—this in clean purity; and 2d, to apply with its whole weight whatever of convincing proof lies in the fact, that in all the years of my practice, having used this gold, with the admixture of no other, *for every cavity*, throughout at least fifteen of these years, I have never found discoloration of its surface to obtain in my fillings, except in very rare instances in the mouths of some individuals where foil stoppings of some other operator in the same mouth were *doing the same thing in other teeth.* I certainly fail to see the propriety of laying at the door of crystal gold the peculiarity of an oral secretion which affects all golds alike.

Crystal gold is not a putty or a soft amalgam to *plaster* into a tooth, as many men seem to conceive it to be, and as, unfortunately, the old directions accompanying it suggested. It is essentially a cohesive gold, and must be worked as such, and with the same conscientious care in using small, or at least thin pieces, and of being sure of the perfect condensation of each piece before adding more; the impossibility of going back to that underneath, or of perfectly condensing the under part of a thick piece, being at once appreciated when one considers the great cohesiveness of the material, as well as the fern-leaf formation, which combine to make it prone to condense a crust upon the surface and leave that underneath soft and "punky." This need never be if the honest care be given to condense it that would be given to cohesive foil under the same circumstances, and *with* this conscientious care, other things being equal, no leaky or otherwise imperfect stoppings need ever occur. I make this last statement wittingly, and with a full comprehension of all that it involves, and, indeed, herein lies the very soul and essence of my paper. I repeat, if crystal gold be given the same conscientious manipulation that the same operator would give cohesive foil, the same or better results would follow its employment. Nothing in relation to it, however, can be more absurd or inconsistent, to my mind, than to imagine an operator taking a "mass as large as the cavity," as the old directions say, and as many operators who use it *do*, and plastering or cramming this mass of exquisitely adaptable, but purely cohesive material into a cavity, and having the least expectation of getting *any* of the expected results of this adaptability. It ought to be built up from retaining-points or cavity angles, or other anchorage, piece by piece, like cohesive foil, condensed perfectly as one proceeds; like cohesive foil, packed directly against the walls of the cavity; like cohesive foil, neither chopped up by

punching fine points through it on the one hand, nor "modeled" into a stopping with large instruments on the other, and no expectation entertained of its "spreading out" under the instrument any more than would cohesive foil.

It has all the fine impressionableness and compliant quality of soft foil, and to *just the extent of the difference between its uncondensed and its finally consolidated condition*; hence, any unnecessary handling of it or any condensation of it before it has actually reached its position in the cavity, is decidedly against securing the best results from its employment, and a deliberate throwing away of its chiefest excellence and most valuable attribute. For this reason, moreover, I have always used No. 1, as I conceive (to paraphrase the above) that if the gold be already half condensed, either in the muffle (as Nos. 2, 3, and 4 are, they all having been originally No. 1), or by the heedless handling of No. 1, half the value of crystal gold as such has been lost to start with.

What I conceive to be a rank abuse of the material, which occurs to me in this connection, is the practice of some operators of holding the cake of gold in their left hand while operating, and dragging off each mass as they apply it. Many, indeed, of the beautiful characteristics of crystal gold, each of these lumps must have, by the time they reach the cavity!

I have had gentlemen mention to me that they had found it so difficult to keep a level surface with this gold during the operation, that they had, therefore, abandoned it for foil. Now, it certainly seems to me, on the contrary, that it has large advantage over foil in this respect, as in using the latter (granting, as all must, that it is impossible to layer the whole surface of the stopping from wall to wall with each pellet) there must remain with every one added a defined shoulder at each of its edges; whereas, with crystal gold, the edges of the pellet may either be allowed to run out to single microscopic fern leaves, or be gently molded into any required position on the flat surface, or to fill vacancies in the surface, with flat, finely serrated adjuster, to be followed, of course, by the smaller condensing points, this being, with the employment of small "foot" pluggers in building operations, or other large surfaces, the only place where large points, in my opinion, are admissible.

As to the plugger points most appropriate to be used with this gold, they may be of any sort *except* those coarsely or deeply serrated, or such as cover a large surface; except, perhaps, as specified above, in flat surfaces or in building operations, when these last may be advantageously employed for placing the gold in position and tacking it, the actual condensation being done with smaller points. My own points are very small and carry very fine and shallow serrations,

much the same, I fancy, as any careful operator would employ with cohesive foil. An excellent point surface is that of the natural crystallization of the steel, which may be easily obtained by forming the point a little longer than necessary, full-hardening it, breaking it off square with plyers, and then drawing down the hardness to the required temper.

The filling may be proceeded with by any method which would condense any cohesive gold, viz., hand-pressure, or hand, engine, automatic, or electric mallets. I employ, interchangeably, the first two and the last, according to my patient, or to convenience of access as to the particular cavity in hand, or to my ability to get direct action for the mallet.

For the purpose of avoiding the production of condensed edges, as well as to avoid mutilating and cutting the continuity of the fern crystals, I never cut my cake into pellets with a razor as some suggest, but prefer to retain the fibrous crystals in their natural condition, and so retain their interlacing and matting power at their best by picking or tearing off, with fine pointed tweezers, bits or pellets of a proper range of sizes for the particular operation in hand, holding the cake very gently in the left hand, being most careful not to squeeze it with the fingers, on the one hand, or too closely approximate the points of the tweezers upon the pellets, on the other.

These same condensed points in the gold, just cautioned against, may be heedlessly produced, by the way, in great numbers in each stopping by thrusting small pointed pluggers through the pellets of gold, and so chopping them up before condensation.

It is scarcely the province of this paper to go back to the A, B, C, of operative dentistry, but I may perhaps remark, *en passant*, that fine operations can scarcely be produced in this way with this gold or with any other.

Gentlemen have sometimes held up their hands in holy horror during my clinics at the idea of my touching so "absorbent" a material as this is with my, even dry, fingers when holding the cake in my hand preparing the pellets, but while touching it with the fingers may be entirely avoided if one wishes, by using some other method of holding the cake, as *e. g.*, running needles through it into the box, etc., this objection seems somewhat captious when it is remembered that not more than one in fifty of the pellets has ever received the touching any way, and that whatever of contact there was has been with the exterior surface of any given pellet, and from whence any contamination is wholly removable by the annealing flame, a very different condition of things from touching the surface of foil sheets, and folding the contaminated surface into the interior of the pellet where no annealing flame can ever cleanse it, as no

evaporation can be had except from the exterior surface. However, if they never treated the material any worse than this in any respect (presuming that they anneal each pellet afterward, as I invariably do), they need have no fear whatever. I do assure them as to their abundant success with it.

Crystal gold carries in its composition so many possibilities, so many excelling qualities, so great a combination of all the beauties of all other golds in its own complex nature, that I cannot conceive of any operation upon the teeth which could be accomplished with any gold whatever, which could not be as well or better done with this, besides securing its collateral advantages; and so much am I impressed with the fact of its uniting the valuable characteristics of all other golds in itself, that, seeing the continual experimenting both by dentists and manufacturers to produce in foil qualities which crystal gold has possessed all the time, and the glorification which ensues upon the discovery of single ones of these excellences, without, of course, in any sense depreciating the enterprise of the workers, I have been often reminded, in a whimsical way, of the so-constantly recurring inquiry of our patients, "Doctor, is cigar ash good to clean the teeth," or is pumice, or charcoal, or what-not, when their dentist either supplies them with, or directs them where to get an entirely reliable tooth-powder, which possesses every possible requisite for the purpose.

I have carefully avoided claiming that operations could be more rapidly performed with crystal gold than with foil. I am aware that this claim is often made, but from my own experience imagine it to be based more or less upon the "large masses" and "plastering" method of producing stoppings. I have never believed it possible to properly pack and consolidate crystal gold any more rapidly than foil, but the completed stopping is not only much harder, but contains more weight of gold in the same cavity, which point, while it may be thought one of no moment, or, indeed, a positive disadvantage, by many good men who believe that too great efforts are often made to so absolutely condense the gold in a cavity is, nevertheless, an indication of how exquisite and literal an adaptation has been made to the walls of the cavity by this gold, when it has gone into the cavity so loose and spongy, and has been brought while there to so marvelous a state of solidification. It must, moreover, be borne in mind that this condensation has been effected with much less force and urging than would have been required for the same stopping if made with foil.

Finally, to show you that it is from no mere enthusiasm, and from no obstinate endeavor to make my cavities and operations fit the material, instead of the opposite, that I employ crystal gold exclu-

sively, I have often and again, from a conscientious feeling that such *might be* the case, procured some of the different and most approved forms of foil preparations, and kept them on one of my trays before me during the day's operations, promising myself to employ them if I could possibly find any place for them, but have gone through the whole day and found no position in any cavity where I felt that I could do as well as I was doing with crystal gold; much less could I secure any advantage by their employment. The fact remains, and is proved to me that, in my hands at least, crystal gold possesses *all* the requisites for the perfect gold stopping, and it certainly behooves me, gentlemen, to "hold fast that which is good."

ADDRESS.

BY DR. N. S. DAVIS.

(Delivered at the opening of the Chicago Dental Infirmary.)

Mr. President and Gentlemen: The occasion of our assembling this evening, as has been stated by the president, is to inaugurate another institution having for its leading object the extension of relief and aid to a portion of the community hitherto inadequately provided for. While hospitals, dispensaries, and various charitable institutions have been opened for all other classes of human ailments, none have hitherto been provided in this city exclusively for the benefit of those who may be suffering from defects, deformities, or diseases of the teeth, gums, jaws, and their associate parts. A very limited amount of provision has been made in one or two of the dispensaries for this purpose, but not in any measure adequate to the wants of this class of the community. During many years of practice in the city, patients of the poorer class have often come under my observation very much needing assistance in reference to their teeth and masticating apparatus, and yet unable to pay ordinary fees for such work. Of course, I or any other physician under such circumstances would not feel at liberty to send them to a dentist's office, to intrude upon his time or take his services, knowing that they were unable to pay for them, and often they were obliged to accept inadequate attention or suffer with only such relief as nature herself would afford. But, with an institution such as this is intended to be; located in the central part of the city; open at well-known hours of the day; provided with the best class of attending professional men in that line specially for the purpose of receiving patients gratuitously so far as their services are concerned, and only at the lowest rates of charges for materials used, when such are needed, every physician as well as other members of the community would know where to point such patients to procure the relief that they

needed; and in a population such as this city affords, it would be found that the numbers seeking such relief would be abundant for occupying the time and taxing the resources of the institution to its fullest extent.

That this class of persons needs the means of relief as much as any other class, will be evident on a moment's reflection concerning the acuteness of the suffering which diseases of the teeth occasion, and the permanent bad consequences which they lead to in the formation of abscesses, the decay of the bones of the jaw, sometimes occasioning long-continued suppuration, and sometimes ultimate loss of more or less of the jaw-bone itself, and consequent permanent disfigurement of the face. The fact that such an institution is needed, from the number of those who require its services, and the character of the suffering that is to be alleviated, needs no further comment; but it will be apparent to those who choose to investigate the subject that there really is a necessity for such an institution, and that it is calculated to do as much good in the sum of benefit that it confers as any of the charitable institutions that have already been established for other classes of the sick.

But the institution that we inaugurate to-night has other objects of importance in addition to that of conferring benefits upon the afflicted, and which are worthy of careful consideration. Among these objects is the imparting of instruction to those who are preparing for the practice of that department of medicine and surgery which you call dentistry. That all persons qualifying themselves to practice any part of the healing art, whether it be to take charge of diseases of the teeth and the oral cavity, diseases of the eye and ear, of the respiratory organs, or of the body generally, require for their adequate preparation direct personal observation and training with the sick, bringing the learner directly to the observation of the diseases that he is preparing to treat, in what is at the present time called clinical instruction, is so apparent to the reflecting that it needs no illustration. Neither does it require any more than a moment's thought to enable any citizen to perceive that the more thoroughly those preparing for any department of professional work are trained by the privilege of personal observation in the department they are cultivating, the better are they prepared to confer the highest degree of benefit upon the well-to-do or even the wealthiest in the community. Consequently the opening of an institution in our midst that, while it provides a genuine charity for the class of sick needing the aid of skilled dentists, is calculated to confer great benefit upon them; the arrangement by which the services rendered to them are made available at the same time for the practical instruction of those who are preparing for this work,

is at every step qualifying these young men for doing the most skillful work to all other classes of the community. Consequently, again, the very means that may be contributed by our citizens of any and all classes to found a dental infirmary, is not only so much given to aid a class of the poor, but collaterally redounds directly to their own benefit by affording a better opportunity for educating those on whom they themselves or their successors in the community will depend for relief.

It may be supposed by some that to allow students pursuing a profession to be present to aid and assist, and thereby enjoy the opportunity of practically learning the diseases, deformities, and defects belonging to the department of dental work, would be an unnecessary annoyance to those who are suffering; just as it is often imagined by many in the community that to admit medical students to attend a hospital for clinical instruction, or a dispensary opened for the sick, is calculated to unnecessarily annoy and expose the sick. But more than thirty years' continuous experience and observation have demonstrated to me that there is no other mode by which the community can insure so careful attention on the part of the professional staff attending a hospital or dispensary; no mode by which they can cause that staff to be so punctual, so careful in their diagnoses, so considerate in what they shall do or direct in the treatment, as to place a class of learners or students directly with them to observe their work, ready to detect any errors, and in whom they are personally interested to promote their education. Leave members of a staff to attend gratuitously month by month a charitable institution without pay, without any collateral object addressed to their ambition in teaching—simply to go and devote the necessary time to prescribe for a given number of sick and away again—and all experience has shown that very few out of the whole number that thus engage will long continue purely gratuitous work, but will leave it largely to the internes or subordinate officers, satisfying themselves by simply calling often enough to generally superintend the progress of affairs. But if the members of the staff are interested in teaching, their reputation is directly at stake for punctuality, accuracy, and faithfulness in the performance of their duty, and the presence of young men being educated in this or any other department of professional work is the surest guaranty of bringing faithful and accurate service to the sick under their care; and often—very often in my own experience—the sick themselves are more intensely interested in listening to the exposition of their diseases, and what is necessary to do for them, than even students who are there to learn. Consequently, so far is the opening of an institution under proper regulations for instruction from being any objection or hindrance to

the charitable part of its work, that I deem it one of the most important means for insuring the carrying out of its charitable work with more efficiency, and thus commanding a higher order of talent to attend it and more fidelity in the execution of all its details than can be obtained in any other way. I am sure that, so far as the citizens of Chicago can be made to understand the objects, both in their charitable aspect and in their relation to the teaching, they will not hesitate for a moment to contribute all the funds needed to carry the institution on with a degree of success that will make it one of the most important existing in the city. Some of you that are here may think that a small beginning of this kind, with but little means, untried in the nature of its operations, has but little prospect of success. But if you remember that Chicago itself is but little more than half a century old, and that all the charitable institutions we have, have been planted and developed within that short period of time, you will lose much of that hesitation or doubt. When I look back on my own experience, and find that it is only thirty-three years since the first public hospital in Chicago was opened for the sick, with only twelve beds, and those temporarily provided in the private boarding-house of a lady, who was to board the patients and nurse them, the late Dr. Brainard attending to the surgical patients, and I to the medical, I see within that brief period of thirty-three years that that institution has its building alone costing over $100,000, accommodating its two hundred or three hundred sick, and one of the largest hospitals in the country. There is no reason in the nature of things against success, but, on the contrary, much in the fact that this institution you are planting to-night is almost without competition in its offers of relief to a large class of sufferers which would make it, in less than the period of time I have alluded to for the growth of the hospital just mentioned, an infirmary permanently located, permanently provided for in its accommodations, and having attained a growth and an importance that is not second to any other hospital in the city.

But there is a third object for which I understand this institution is founded, which, though less directly related to the sick, and perhaps less easy to be appreciated by the community, yet in its ultimate bearing is of equal importance with either of the other objects I have named. This is the reclaiming of the whole field of dentistry and reinstating it as a department of general medical and surgical science, and in doing so providing that those who in the future are permitted to practice the dental art shall be required to take the same general education in all the departments of medical science as those who practice any other department; so that, instead of a large portion of dentists being rather of the capacity of mechanical

workers upon the teeth, without a knowledge of physiology, anatomy, and the other departments of science, they should all be educated fully in the various departments on the same basis, through the same schools, and be required to comply with the same full requisitions in all respects as either the specialists of eye and ear or throat and chest diseases, of gynecology, or of general practice. In other words, dentistry should be simply a department of medicine, and its votaries educated in all respects, and subjected to the same tests of qualification, as other practitioners. To carry out this object you have already secured a professorship of dentistry in each of the medical schools of the city. In those schools, in the regular course of instruction in the various departments, such young men as desire to follow the limited profession of dentistry, instead of general practice, will receive from the professor of oral or dental surgery all the instruction theoretically and scientifically essential to the treatment of the oral cavity, and when he has passed through his period in the medical schools he then comes to your infirmary for the direct practical application of his knowledge to the study and practice of the mechanical part of the art. Thus you make the members of your profession doctors of medicine qualified in all respects as any other doctor of medicine. Your infirmary gives to them the same clinical instruction to complete their study that our hospitals and dispensaries give to the other classes of practitioners in their various departments.

I congratulate you on the inauguration of this undertaking. It is a departure that places you in Chicago in the lead in a great work, which is destined to be completed within a limited period of time, and to so elevate and increase the usefulness of the dental profession as to make it really one of the important movements of the present time. The way is fully open for your success. The recognition of dentistry as a department of medicine by the American Medical Association, at their annual meeting in Richmond two years since, and the establishment in that body of a section directly devoted to oral surgery, which is the same as dentistry, constituted a full recognition of that branch as a part of the general field of medical and surgical science. The placing of a condition upon membership in that section, that they shall be graduates in medicine, has not only met the recognition of your branch of the profession, but it has drawn a line of distinction; and to avail yourselves of the recognition thus given, the necessity comes with it for your members being qualified and commissioned as doctors of medicine. Having taken the lead in this work, you are acting only in consonance with the general tenor of Chicago as a great center of professional instruction. It was here in Chicago, in 1850, that the first positive

requirement that medical students should attend clinical instruction in the hospital, as a condition for graduation, was ever made in America. Hospitals were open for instruction. Students had the privilege of attending long before that in all the leading schools, but it was optional, and only a small percentage actually attended. But at that early period in Chicago the faculties of the schools then existing made it a positive requirement, and as much a condition for graduation, as the attendance upon any other department of instruction in the school. The inauguration of that addition has been followed out by other schools in considerable numbers, and has become one of the most prominent requirements of medical instruction. It was here in Chicago that the first medical school was established that required a full graded system of instruction, adapting the studies to each year of study, and examinations at the end of each year, instead of the ordinary requirement of only two courses, and those simply ungraded repetitions of each other. Although standing alone for twelve years, nevertheless the principle was so apparently just, and addressed itself so strongly to the profession, that at the end of this time the old medical school of Harvard University came forward and adopted the same regulation. A few years later the old Pennsylvania University, the first medical school in America (established during the colonial period of our existence), fell into line, and since then many of the schools now dotting the country from the Atlantic coast at Boston to San Francisco, have adopted the system. It is destined to go on until it becomes the universal method of teaching.

I mention these things, Gentlemen, to-night to show that you are not only doing a great work, but that you have commenced in a city that is already noted for its advancement in all the departments of medical instruction and medical institutions. For success, ultimate and complete success, in the work you have undertaken, it requires but three things—a knowledge which qualifies you for your work, fidelity in its execution, and unswerving steadiness of purpose in its pursuit. If either of these is missing you will fail. With these three constantly guiding your conduct, there is no such thing as fail. Before another generation has passed away some of you will be able to realize that the revolution has been completed, and the little work you inaugurate here to-night, in this unfinished building, will stand on the pages of history as the commencement of the reclamation of dentistry to its proper place as one of the departments of medicine and surgery, the elevation of the profession to the level of fully educated doctors of medicine, and the enhancement of its influence and power for good.

With these sentiments, expressed with a confidence founded on an

abundant experience and observation of human nature and the progress of events in the past, I bid you go on with your work, undismayed by temporary discouragements and lack of interest here or there where you may apply for aid. Keep steady to your purpose, and your success will be complete.

FILLING PULP-CANALS.

BY W. STORER HOW, D.D.S.

The present concentration of thought upon the subject of artificial tooth-crowns, renders it pertinent that attention should be directed to the proper preparation of the pulpless roots on which the crowns are to be mounted. There are also many pulpless teeth, the roots of which are either left unfilled, or are but partially filled, because of difficulties which appear insurmountable to the operator.

The methods now to be described have been practiced for twenty-five years, with a reasonable measure of success, and may, therefore, be repeated in practice by those who have no better way of positively filling such canals. Lack of time and space precludes a discussion of the subject in detail with allusion to other well-known methods, which may, however, be characterized in general as *suppositive* as distinguished from this *positive* method. The preliminary treatment of the pulpless roots will receive but brief incidental mention.

Fig. 1.

Fig. 2.

We consider first a decrowned incisor root, Fig. 1, vertical section. While under treatment, great care has been taken to exclude from the canal any solid matter which could close or be forced through the foramen. The canal has not been enlarged, nor will it be until the foramen shall have been permanently closed, because the débris might obstruct the canal, and so delay or prevent recuperation.

It will be noticed in the cut that the canal is constricted near the apex, and in normal cases it will be generally found that the foramen is smaller than the canal, so that a square-ended canal-explorer, Fig. 2, will in a careful hand report a sensible obstruction at that end of the canal, the length of which may thus be accurately measured by a sliding gauge, Fig. 3. The explorer is flattened, or ovoid in cross-section, .004 of an inch thick, and .010 of an inch wide at the end, gradually increasing in the same relative proportions for more than an inch in length towards the handle. The pluggers have a greater diameter, but like proportions, with handles adapted to the same flexible gauge, Fig. 3. The filling-material is invariably tin foil

(preferably No. 10) cut with the foil shears into shreds a quarter of an inch long and the width of the explorer. A bunch of these shreds is taken with the foil-pliers to the mouth of the canal, and thence carried to the apical shoulder with the plugger, which, by its gauge, will indicate the depth to which the material must be forced to *exactly close the foramen*, and that is the most important thing to be done, and to be positively known to be done; for, if the foramen is tightly sealed without protrusion of the stopping, it is nearly certain that there will be no subsequent trouble with the root, because the canal cannot again become the receptacle in which are generated the mephitic gases that cause and continue alveolar abscess.

FIG. 4. FIG. 3.

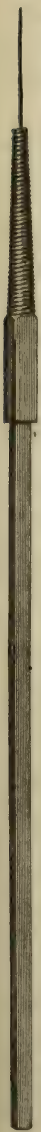


FIG. 5.

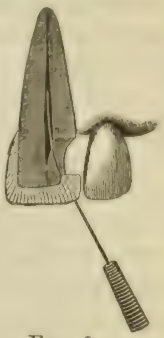


FIG. 6.

All methods are defective in which the operator does not *know* that he has closed the apical foramen. He supposes that his metal wire, or gutta-percha, or lead, or wood pin has been driven home, but the canal invariably tapers so that pressure on the outer broad end of the wedge jams that end, when the inner end may not occupy one-quarter of the surrounding canal, and there is, therefore, an unfilled tract of the canal in the neighborhood of the foramen, and a consequent failure to do the essential thing desired. Thus the wedge method, in any of its forms, is radically defective in both principle and practice. The fluid or soft plastic methods are likewise defective, because it is only supposed, but not positively known, that the foramen is, in fact, tightly closed, to say nothing of the mischiefs likely to follow the probable forcing of the solution through the foramen.

FIG. 7.

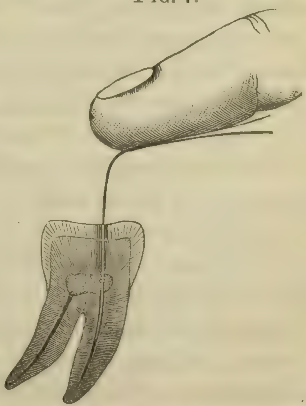


Fig. 4 shows a plugger gauged to the length of the canal in Fig. 1. Fig. 5 shows a section of an incisor with the gauge and plugger in position to be pushed exactly to the apex, and

this example will serve to illustrate the method for the superior teeth anterior to the second bicuspids.

Fig. 6 shows a superior second molar drilled centrally through the crown to afford access to the root-canals. In this instance the gauge is omitted, because the plugger is bent so that the angle serves as an approximate gauge, and also enables the operator to use the ball of the finger in forcing the plugger into the minute canals of the buccal roots.

It is obvious that if these roots can be thus reached and filled, the first molars and second bicuspids, and in many instances the third molars also, may be filled to the apices of their roots.

Fig. 7 shows an inferior second molar likewise operated upon, and this example covers the whole range of the lower teeth which, in general, can thus be filled.

There will, of course, occasionally be found crooked, accidentally obstructed, and wasted roots, which may not be positively filled, but with care, patience, a mastery of this method, and suitably-shaped and fine instruments, a great majority of pulpless roots may be rendered useful and comfortable during the life of the patient.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular meeting March 20, 1883, at the house of Dr. S. G. Perry, No. 10 E. 34th St. The meeting was called to order at 8 o'clock P.M.; the president, Dr. S. G. Perry, in the chair.

Dr. A. L. Northrop made the following remarks upon "Odontalgia:"

Mr. President and Gentlemen: I have been asked to say a few words on the subject of "Odontalgia." As we are to have a dissertation upon pericementitis, it will not be necessary for me to go deeply into the subject allotted to me; although it is a subject which has been in the minds (and mouths) of both patients and operators for very many years.

Strictly speaking, odontalgia means simply tooth-pain, or pain in the teeth. As to this, while much may be felt, little need be said. The thing which most occupies us, as dental operators, is the cause of this pain. I will briefly arrange the causes of odontalgia under two main heads, *sensitive dentine*, and *caries*.

Sensitive dentine may be caused by thermal changes, recession of gums exposing the junction of enamel and cementum, mechanical abrasion or wearing, chemical abrasion, and caries. Thermal changes give only slight pain, which ceases upon removal of the cause. Re-

cession of the gums will often cause pain not easily located, while still persistent. Large metallic fillings, too, often induce odontalgia, especially if near the pulp, through thermal irritation of that organ. Persons whose teeth are worn by attrition nearly to the pulp may suffer pain; also, sometimes, when only the enamel has been worn through. Breakages of the enamel, exposing dentine, are apt to cause odontalgia. Cracks in the enamel, too, are fruitful sources of pain, as also deeply penetrating sulci. These cases are often very difficult of diagnosis; yet they occur, I think, almost or quite as often as the tooth-pain from caries.

The tooth-pain from caries differs from that proceeding from the above causes, because frequently, through pulp-exposure, pulpitis is a complication. In such cases I would suggest a new name which shall include the added cause of pain. I would call pain from this combination of causes *pulpalgia*, not odontalgia; the new name indicating plainly the pulp-complication.

In pulpalgia the pain may be caused by means *direct* or *indirect*. Pressure, as a source of pulpalgia, may be both direct and indirect in its sources. Food or débris lodged in the cavity of decay will indicate the direct type, while any systemic cause for a too great influx of blood to the pulp may, through resulting congestion, cause pain indirectly. Pulp-stones, too, are a very frequent source of pulpalgia, either directly, by irritation, or indirectly, by causing congestion of the vessels. These do not need the presence of caries to induce their consequences. The chemical action of various condiments, as sweets or acids, is often a cause for pulpalgia. The pain will often spring from reflex nervous action. Indirectly, and as systemic causes, malaria, debility, dyspepsia, neuralgia, pregnancy, and many other excitants, result in pulpalgia. But, as has been seen, all the causes of odontalgia and pulpalgia may be grouped together under the three main divisions of source,—sensitive dentine, pulpitis, and reflex nervous action.

The treatment appropriate to all these conditions, is various in detail, and often tiresome in application. I shall not attempt to indicate details, but merely say that sensitive dentine from gum recession or acid reactions indicates alkaline treatment. That from abrasion or slight caries may call for escharotics or coagulants,—agents which, by forming with the albumen in the tubuli insoluble compounds, prevent transmission of the external irritation to the nerves; of such are alcohol, tannin, creasote, etc. Pain from deep-seated caries demands the treatment for the latter lesion. In pulpitis we may use, generally, antiphlogistic, anti-inflammatory, anti-congestive remedies, as depletion and counter-irritants. Depurative treatment is generally of value, as purges, cooling or saline draughts,

alkaline washes. Anodynes are in constant use in this disease. Of these the most important are opium and its derivatives, aconite (which often seems to exhibit an almost specific action in controlling the circulation), atropia (an aqueous solution, 1 in 100), ether, and chloroform.

There occur pains in and about the teeth which it would be difficult to classify under any of the heads that I have named. These spring from obscure sources discovered generally only accidentally. I think almost all such cases will be found to have a systemic origin, and generally to be associated with a low degree of vitality in the patient. They cannot be properly classed under either of the heads given above,—odontalgia, or pulpalgia; therefore I have nothing further to say about them.

Dr. Frank Abbott followed Dr. Northrop, speaking upon the subject of "Pericementitis, (periostitis), its Causes, and Treatment:"

There is probably no condition more distressing to the patient, nor one more frequently met with in practice, or which tries the patience of the practitioner of dental surgery, and demands, on his part, a thorough knowledge of pathology and therapeutics, more than pericementitis. We are almost daily called upon by all classes of society to relieve the fearful pain often accompanying it. It is often the case, however, that no pain, nor even tenderness upon percussion, is present, but some remote part, such as the ear or the eye, is affected, or a general neuralgic pain, extending over the side of the face and head, is developed, (sometimes this neuralgia may even extend to the neck, shoulders, chest, and arms). It is this latter class of cases which, if they come into the hands of dental practitioners, are by far the most troublesome to treat successfully. Generally, however, the general practitioner of medicine, or some other specialist, is called upon for relief. It is no uncommon occurrence for general practitioners to take such patients through a regular course of treatment with quinine and iron, without the slightest idea of the real cause of the fearful neuralgia they are suffering from; nor for an oculist, or an aurist to expend his skill in surgery and medicine, to the utmost, to relieve grave symptoms which are present in the eye or ear, without success.

It has often occurred to me that dental surgeons are inclined to look upon live pulps in teeth as of too little consequence, judging from the indifferent manner in which they speak of applying arsenic for their destruction. In view of the fact that they are placing all patients subjected to such treatment in a condition more or less extraordinarily susceptible to the ills above mentioned, it would seem that the destruction of the pulps of teeth could not be too strongly con-

demned; but, it would be said, "we cleanse the pulp-chamber and canals of every particle of the dead pulp, and fill those canals perfectly, and how is it possible for pericementitis to follow?"

In order to arrive at a clear understanding of the subject, let us first carefully consider the tooth in its physiological condition. In the general anatomy of the tooth, we have the crown, the neck, and the root. The crown projects from the gum, the neck is encircled by the gum, and the root is surrounded by the alveolus. In the center of the root, and extending into the crown, the pulp, when undisturbed, finds a resting place. The enamel is formed or built up by what is known as the enamel-organ, the remains of which are to be found, as a thin epithelial covering reflected from the epithelium of the gum, extending over the entire crown as the tooth comes into the mouth. This covering (Nasmyth's membrane) however, by mastication, cleansing, etc., soon disappears. The dentine on the other hand, is formed by the direct work of the pulp, by a process of formation, which goes on (unless some abnormal irritation should prevent) through the life of the patient. After the enamel and the crown portion of the dentine are formed, the work of the formation of the root proceeds. It is then that another element enters into the construction, viz., the cementum. This is the product of the pericementum. In structure it very much resembles compact bone. It is surrounded by the pericementum, from which it receives its nourishment; the dentine and enamel receiving their nourishment from the pulp.

The most reliable analysis we have of the different parts of a tooth gives us, in the enamel, 3½ parts, in a hundred, of organic material; the remainder, 96½ parts, inorganic; in the dentine, 28 parts of organic, and 72 of inorganic, and in the cement, 33 parts of organic, and 67 inorganic. From the discoveries of Dr. C. F. W. Bödecker, we learn that a portion of this organic material is living matter; that the portion of the living matter which is in the dentine is in direct connection with, or consists of branches of the non-medullated nerve-fibers of the pulp, and the portion in the enamel and cementum, is connected with, in the one case, smaller branches, and in the other with larger branches, of these dentinal fibers; so that we have in a tooth a living organ, connected in every part directly with the living portion of the general human organism.

With this understanding of the normal structure of a tooth and its connections, we will proceed at once to the consideration of our subject, viz., the causes of pericementitis. These may be enumerated as follows:

1. Any organic disturbance of the dentine or cement.
2. Direct irritation of the pulp.

3. Direct irritation of the pericementum.
4. Putrefaction of a dead pulp in a tooth entire.
5. Putrefaction of any portion of a dead pulp left in the canals.
6. Putrefaction of the organic portion of the dentine, which, under any exciting cause producing a determination of blood to the part, becomes absorbed by the living matter of the cementum, the effect of which is directly communicated to the pericementum.
7. Mercurial poisoning (ptyalism).
8. Uterine irritation, as during gestation or the menstrual period.
9. Exostosis.

The usual organic disturbance of the dentine or cement is due to caries, and if this is properly removed, and the cavity thus formed hermetically sealed, so as to prevent the further irritation of the living portion of the organ, no further treatment is generally required.

The direct irritation of the pulp occurs under varied conditions, such as where caries has destroyed its natural covering, and food, etc., comes in contact with it; where any capping material rests upon it, whether in cases of simple exposure or where a portion has been amputated and the remainder subjected to the same treatment; or in cases of calcular deposits (pulp-stone). The treatment of exposed pulp does not properly come within the scope of this subject, and we will therefore pass to the next condition, that of pericementitis resulting from the irritation of the pulp from any capping material. The first step noticeable in this process is an interference with the circulation. This causes (sometimes in a very short space of time) an engorgement of the blood-vessels of the pulp, at and around the primary lining, which condition rapidly diffuses itself through the remainder of the pulp and extends through the foramen to the vessels of the pericementum. It is the pressure produced by the distended blood-vessels upon the sensory nerve-fibers of the part that produces the soreness and pain. It would seem that the rational treatment in such cases would be antiphlogistic, or a reducing of the circulation, either by counter-irritants, leeches, or the application of some remedy to the gum which would produce the desired effect. The most simple and effective counter-irritant is a small mustard poultice, made as follows: to one part of mustard add two (if a mild effect is desired, three) parts of flour, fold it in a small piece of linen, take a stitch or two in it, to prevent it from unfolding, dip it into hot water and apply to the gum over the affected tooth. A fresh poultice may be added every hour or two until relief is obtained. Cantharidal collodion will serve as a counter-irritant, and a depurative at the same time; it very readily, when applied to the gum, producing vesication, thus not only determining the blood to the gum from the pericementum, but relieving it of the excess of serum as

the blister is formed. The application of leeches (two or three) to the gum over the affected tooth is in many cases attended with almost immediate relief, when all other remedies have failed. To many patients, however, they are very objectionable.

The remedy which with me answers almost every purpose in the treatment of this painful affection, is the mixture of equal parts of the saturated tincture of aconite root and tincture of iodine, the aconite being an arterial sedative and the iodine stimulating the lymphatics of the part. This I apply to the gum only once, if relief follows the application; if not, in the course of two or three hours I repeat it, and again in the same space of time should the case seem to demand it. If the first application is made before suppuration has taken place, it very seldom fails to relieve. I would call particular attention to this preparation of aconite, as no other that I have ever tried will produce the same effect.

The direct irritation of the pericementum is produced in a variety of ways,—viz.: from tartar, drilling through the roots of teeth, forcing a broach through the foramen at the apex of the root, long and severe malleting upon a tooth from which the pulp has been removed, or forcing the teeth from their positions, either to obtain room for filling or for the purpose of regulating. In the first instance, the removal of the tartar is usually all that is necessary to obtain relief. Should any one be unfortunate enough to accidentally drill through the root of a tooth, and puncture the highly sensitive membrane, I know of no treatment short of the removal of the tooth that will effect a cure. I cannot conceive of the advocacy of such a measure, purposely, by any man who has the comfort and good health of his patients at heart. The best advice I can give in the treatment of teeth from which the pulps have been removed is to *never use a drill in pulp-canals.*

The forcing of a broach through the foramen is an accident which may occur to the most careful operator. If it is at once removed the lesion will soon heal and the irritation subside under ordinary treatment. Should the broach be broken and the point be left protruding, the result would probably be the loss of the tooth, at least; perhaps a worse result might follow.

The pericementitis resulting from long and severe malleting upon a pulpless tooth may be relieved by thoroughly painting the gum over the tooth with the preparation of aconite and iodine before the patient leaves the chair. This precaution should always be taken after filling a pulpless tooth, whether a perceptible pericementitis has developed during the operation or not.

Many pulps in teeth which become irritated by the inflammation of the pericementum, caused by forcing teeth from their posi-

tions, may be saved from death by the timely application of the last-named remedy to the gums over such teeth.

Putrefaction of dead pulps in teeth is a condition so often found and treated that a description of the process here seems unnecessary. Suffice it to say, that where this treatment has been thorough, and the pulp-canals have been properly filled, any pericementitis that may follow may be relieved by the same treatment as in the previous conditions mentioned.

Putrefaction of any portion of dead pulp left in the canals. This would imply that dead pulps are *not always perfectly* removed. Let us consider for a moment and see whether this be true. There are eight teeth in the upper and ten in the lower jaw, which in almost every case can be thoroughly cleansed of dead pulps, viz., the incisors, canines, and second bicuspids in the upper jaw, and the incisors, canines, first and second bicuspids in the lower. In all the other teeth some of the canals are so small, tortuous, and difficult to explore that I venture to say that, in the hands of the best of men, portions of the pulps are still there when the teeth are filled. Of course, remedies are used to prevent any remaining portion from putrefying, but the contact of this dead organic substance with the living is attended with more or less irritation of the living portion, and when from any exciting cause, such as a cold, a blow upon the tooth, or some constitutional disease, a determination of blood to the part takes place, the absorption of this dead substance becomes excessive, and and an inflamed pericementum follows.

The same conditions are present and the same changes take place at the junction of the living matter of the cementum with the dead organic portion of the dentine, and I have no doubt that this explains in a great measure the frequent occurrence of pericementitis where teeth are known to have been thoroughly cleansed of all dead pulps and carefully filled. Early attention to such cases is necessary, in order that suppuration may be prevented. The treatment is the same as that given for the other conditions. Constant watching and nursing are necessary in all such cases.

Mercurial poisoning or ptyalism produces in most cases a very aggravated form of pericementitis. The inflammation first attacks the gum, which, being deprived of its nourishment, becomes detached from the necks of the teeth, and inflammation of the pericementum necessarily follows. In these cases the teeth must be carefully watched, to prevent any accumulation of tartar that is liable to take place around the necks of the teeth, and a saturated solution of chlorate of potash in water prescribed for the patient to rinse the mouth with every hour until the inflammation subsides. Touching the gums with tincture of iodine is often found to be beneficial.

Uterine irritation, during gestation or the menstrual period, frequentlycauses severe pericementitis in cases where the most careful treatment of pulpless teeth has been resorted to. By applying the aconite and iodine to the gum once or twice, relief is obtained.

Exostosis is the result of what is termed "formative irritability." In other words it is a low, chronic form of pericementitis, and is due to long-continued irritation of the pulp itself, which irritation extends through the foramen to the pericementum, or to the absorption of the dead and putrefying remains of a pulp, or the organic portion of the dentine, or it may be due to some specific poison in the system.

Under one or another of these forms of irritation of the pericementum, its full functions are brought into active operation in an attempt at self-preservation. Lime-salts are deposited upon the cementum, the deposit sooner or later, growing more rapidly than absorption of the approximating alveolus takes place, and the consequence is a pressure of the tumor upon the one side, and resistance of the alveolus upon the other, which produces perhaps a direct irritation of the nerve-fibers in the pericementum; or there may be an interference with the circulation as the first step in the pericemental inflammation. In many instances this irritation is so slight (as I stated in the beginning of this paper) that it can hardly be diagnosed by any examination of the teeth; but an unexplained and incurable ear or eye trouble may develop, or a severe neuralgia may be rapidly prostrating the patient. In such cases the only course to pursue, and one, too, which in my judgment should be resorted to (after proper consultation) is the removal of the tooth, particularly if the supposed offender be what is commonly termed a dead tooth, or one which (while it may have a live pulp in it) has no antagonist.

In many instances, I have no doubt, teeth or parts of teeth are kept in the mouths of patients for years, during which time the irritation to the general system more than balances their usefulness, either for masticating purposes, or for appearances.

(To be continued.)

AMERICAN MEDICAL ASSOCIATION.—SECTION ON DENTAL AND ORAL SURGERY.

(Concluded from page 369.)

Third Day.

Dr. Williams resigned the chair, and Dr. W. W. Allport, of Chicago, was elected temporary chairman of the Section.

A paper on "Diseases of the Maxillary Sinus," by Dr. Geo. L. Parmele, Hartford, Conn., was read by the secretary.

Dr. Parmele's paper described the anatomical relations of the an-

trum of Highmore to the teeth, the nose, and the eye, and directed attention to the consideration of the diseases connected with the teeth which affect it. Some of these are formidable, but most of those which come under the notice of the dentist are simple and easily cured; if neglected or improperly treated they may assume so aggravated a form as to endanger the life of the patient, and we should so familarize ourselves with the various manifestations as to be able to accurately diagnose and treat these cases. The principal diseases of this class are inflammatory distention of the antrum; dropsy or mucous engorgement; diseases caused by foreign bodies or wounds. The source of inflammation of the living membrane causing distention can be traced in the majority of cases to a diseased condition of the superior molars and bicuspids. Sometimes, also, it may be occasioned by the dentist forcing irritating substances through the apical foramen in the treatment of devitalized pulps in teeth whose roots extend into the antrum. Blows upon the face or injuries in extraction may cause inflammation, or it may be an extension of catarrhal disease from the nasal cavity; or it may be set up by foreign bodies entering from without or from within the mouth. As a general rule treatment is quite simple; over-treatment in many cases retarding a cure. Often the mere extraction of a diseased tooth is all that is called for, generally the first molar, and if, on doing this, the antrum is not reached, the perforation of the cavity by means of the dental engine. Even in doubtful cases it is well to perforate to ascertain what the contents may be. Some prefer perforating the alveolus above the gum; but the opening should be at the lowest point possible. Vent should be maintained till the mucous membrane has regained its normal condition and the cavity should be carefully cleansed with injections of tepid water to which is added some antiseptic. Often this is all that is necessary, but sometimes frequent injections of tepid water, followed by stimulating injections, must be employed. Among the causes of mucous engorgement of the antrum are diseased teeth, exposure to cold, blows, etc. The first aim in treatment is to evacuate the contents of the cavity, and remove the cause. The opening should be maintained with plate and tube until by the use of stimulating and astringent injections, the parts have regained their normal condition, when the opening may be allowed to heal. In case of wounds of the antrum the bleeding is always slight. The treatment is simply to remove any foreign body which may be present, and keep the parts clean and free from inflammation. In endeavoring to extract foreign bodies from the antrum it should be remembered that the cavity is occasionally divided by partial septa of bone projecting from its walls, forming pockets from which the body can only be removed by introducing curved scooping instruments. This

condition would also naturally interfere with thoroughly cleansing the cavity by injections.

Dr. Allport related the case of a gentleman whom he met some months since, the side of whose face was badly swollen. Two or three surgeons, who examined the growth with the microscope, pronounced it cancer. The gentleman was shortly afterwards in Cincinnati, and called on an old dentist in Covington, who examined his mouth and, finding the floor of the antrum entirely removed, made a free incison with a bistoury. The fetor was very strong and soon filled the whole house. With a scoop-shaped instrument, he began to haul out of the cavity a substance about as hard as hard cheese,—something like little worms,—and kept on until nearly a teacupful had been removed. It took nearly an hour. At the end of two weeks the gentleman returned to Chicago. There were little reddish-blue patches on the inside of the antrum. The dentist who made the operation thought he had demonstrated that there was no cancer, but Dr. Allport had since been informed that cancer had appeared in the antrum.

Dr. L. Buffett, Cleveland. The case just reported is right in the line on which the work of this Section ought to go. The disease in the antrum had its origin in a local trouble, and was non-malignant at first. Undoubtedly it arose from the teeth, the watery portion of the infiltration into the antrum passing off, and the solid mass growing until the floor was entirely absorbed. The presence of the decomposing mass may have been the means of lowering the physical condition so as to permit the development of the cancer, if it was not inherited. If children are begotten by him after this they will have the cancerous diathesis, and by them it will be passed on to the generations to come. Cancer can be developed, if the cancerous diathesis is present, the same as scrofula can, by poor living.

Dr. Shattuck recently had an interesting case of disease of the antrum. The patient's physician had been treating him for neuralgia; there was some enlargement of the cheek, and he found the left superior cuspid absent and the second molar badly decayed. He came to the conclusion that there was something wrong with the antrum. He extracted the decayed tooth, the extraction being followed by a free flow of pus. There was no trouble in passing the probe through the opening into the antrum, where it struck something hard, which proved to be the missing canine. On being removed, its end was found to be necrosed, and it was somewhat honeycombed. The cavity was injected with warm water and the parts readily healed.

The subject was passed.

Dr. Marshall read a report of a case of "Amaurosis from Diseased

Dental Pulp," occurring in the practice of Dr. W. W. Allport, of which the following is a synopsis:

In May, 1878, a married lady, aged thirty-eight, called on Dr. Allport with the pulp of the first superior bicuspid nearly or quite exposed. The cavity was wiped with eucalyptus and filled with oxyphosphate. Slight uneasiness was felt in the tooth for several weeks but finally passed away. In about six months she began to have slight twinges of pain in the left eye, with an increased flow from the lachrymal gland and some obstruction to sight. The pain soon increased till it produced great discomfort, and she consulted one of the most distinguished oculists in New York, who, finding no local cause for the trouble, prescribed constitutional remedies, but no relief followed. Returning to Chicago, she consulted a leading homeopathic oculist, who also, after careful examination, could find no local cause sufficient to account for the trouble. The pain increased so that she could not sleep, and for months she was unable to read or write on account of the aggravation of the symptoms it caused. She again visited New York, and the oculist who had prescribed for her before, after a most painstaking examination, could find nothing that would account for the symptoms, and told her he could do nothing but prescribe constitutional treatment. She replied that her general health had never been better and that the treatment seemed to be of no avail. A few months after this she called to have her teeth treated—two years after the tooth above spoken of was filled. Upon examination the filling was found in perfect condition, but the tooth presented unmistakable evidences of slight dental periostitis, and on the supposition that the pulp was disintegrated or in a state of chronic inflammation, the filling was removed; the bulbous portion of the pulp-cavity was found to be filled with osteo-dentine quite up to a line corresponding to the edge of the alveolus; above this the pulp was living, but in a state of low chronic inflammation. The pulp was removed, the pulp-chamber and canal filled with oxychloride of zinc, and in a few weeks the pain and profuse lachrymal discharge disappeared, and the sight was entirely restored without other treatment.

Dr. Williams. We often see deposits of secondary dentine where the action seems to be natural. At other times, we find it accompanied by an inflammatory action. This case is unique, in going on to fill up the tooth with a secondary deposit to so great an extent, without the trouble being discovered or suspected.

Dr. Buffett. In this case there was very little irritation of the tooth—not sufficient to cause special pain. This you will find true —that in all cases of reflex trouble with the branches of the trifacial, the local trouble will be a low, chronic inflammation; even if it

is at one time acute, this will pass and it will become chronic. We must look closely for very slight manifestations; it is an error to look only for the greater lesions. Dentinal nodules are among the most difficult troubles to diagnose. In different individuals we have dental irritation in full manifestation and the opposite, depending largely upon temperament. Those of full habit need depressants, and those of low habit require tonics.

Dr. Butler. The case is of great interest not only to specialists, but also to the general practitioner. Low or slight manifestations are among the best evidences that it is the result of a chronic rather than an active irritation. Where it goes on slowly we get amaurosis through reflex action. In a case of amaurosis under the care of an oculist in this city, the patient had two superior incisors with decay extending very nearly to the pulp. The irritation kept up and the sight got no better. He (Dr. Butler) made a careful examination of the mouth, and came to the conclusion that the trouble with the eyes was aggravated by the condition of the incisors. He removed the morbid tissue and treated the teeth, and in a short time the eyes improved under the treatment of the oculist, who admitted that placing the teeth in proper condition had been of great assistance.

Dr. Brophy thought that an attempt to save pulps which were partially sloughed off or in a state of chronic inflammation was a mistake, and there was often risk, in such cases, of leading to such complications as had been described.

Dr. Marshall. One fact which such cases emphasize is that the general practitioner should not ignore a thorough examination of the teeth in arriving at the cause of these reflex troubles. Often the teeth are not looked at by them. Cases may be named of neuralgia arising from irritation of a pulp being treated for malaria, the real trouble being discovered only on a visit to a dentist. That was one reason why he was in favor of teaching dental surgery in the medical schools—that the general practitioner might have a better idea of dental diseases and their ramifications than he has to-day.

The subject was passed.

The committee on the appointment of dentists in the army and navy reported that owing to a misunderstanding on the part of the gentleman residing in Washington who was asked to co-operate with them and through whom their communication with the surgeon-generals of the army and navy had been held, they would have to report progress. The speaker thought the first step should be to get an idea as to whether there was any need of such appointments, and to that end it would be well to see if the surgeon-generals would incorporate in the schedule of questions to the surgeons of the army

and navy inquiries from which to find out the proportion of cases of dental disease occurring.

The committee was granted further time.

The committee on the relations of food to tissues was discharged from further consideration of the subject.

Dr. Truman W. Brophy, Chicago, and Dr. John S. Marshall, also of Chicago, were commended to the general session for chairman and secretary of the Section. The choice of the Section was confirmed by the association in general session.

Adjourned to meet in Washington, first Tuesday in June, 1884.

NEBRASKA STATE DENTAL SOCIETY.

The seventh annual meeting of the Nebraska State Dental Society convened at Lincoln, Tuesday, May 22, 1883, and continued in session two days. A larger number were present than at any previous session, and eight new names were added to our membership.

The following were elected officers for the ensuing year:

I. W. Funck, president, Beatrice; M. D. Thurston, vice-president, Columbus; C. R. Tefft, corresponding secretary, Lincoln; W. F. Roseman, secretary and treasurer, Fremont; A. S. Billings, J. M. Lucas, H. C. Miller, executive committee; J. W. Chadduck, A. P. Camp, L. S. Moore, membership committee; W. F. Roseman, C. U. Paul, G. M. Seeley, publication committee.

The next session will be held at Hiawatha, Kansas, first Tuesday in May, 1884, in joint convention with the Kansas State Dental Society.

W. F. Roseman, *Secretary.*

NORTH CAROLINA STATE DENTAL ASSOCIATION.

The ninth annual meeting of the North Carolina State Dental Association was held in the parlors of the Atlantic Hotel, Morehead City, N. C., June 12 to 14, 1883. The meeting was well attended, and great interest prevailed through the sessions of each day.

The following officers were elected for the ensuing year: W. H. Hoffman, president; J. H. Durham, first vice-president; B. H. Douglass, second vice-president; Thomas M. Hunter, secretary; J. W. Hunter, treasurer; V. E. Turner, J. H. Crawford, B. H. Douglass, executive committee.

The next meeting will be held at Raleigh, N. C., commencing on the second Tuesday in June, 1884.

Thomas M. Hunter, *Secretary,*
Lock Box 18, Fayetteville, N. C.

HARVARD UNIVERSITY—DENTAL DEPARTMENT.

The annual commencement of the Dental Department of Harvard University was held in Memorial Hall, Cambridge, Mass., Wednesday, June 27, 1883. The number of graduates was eight, upon whom the university degree, D.M.D., was conferred. The names of the graduates were as follows:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Elliott Bowdoin Bacheller	Mass.	Samuel Sterrett McFarlane	Penna.
Edwin Carter Blaisdell	Mass.	Myron William Smith	Mich.
Frederic William Hill	N. H.	Joseph Ellsworth Waitt	Mass.
Edward Albert Lowe	Mass.	George Arthur Williams	Mass.

AMERICAN DENTAL ASSOCIATION.

The annual meeting of the American Dental Association, which convenes at Niagara Falls on Tuesday, August 7, 1883, will be held in one of the parlors of the International Hotel. The Pavilion in the Park could not be secured for the purpose, and the committee thought better to secure the room mentioned than to again rent Grant's Hall. Both the International and Cataract Houses will give reduced rates to members and their families, as likewise will all places of interest about the Falls where an entrance fee is charged. The Michigan Central, Wabash, Canada Southern, Grand Trunk, and Great Western Railroads, will give round trip tickets for a fare and a third. To secure this reduction of rates, a certificate of membership must be secured from Dr. George L. Field, Abstract Building, Detroit, Mich. Those wishing them should make as early application as possible.

George L. Field,
F. M. Odell,
T. T. Moore,
Committee of Arrangements A. D. A.

AMERICAN DENTAL CONVENTION.

The American Dental Convention will hold its twenty-ninth annual meeting at the Town Hall, Saratoga Springs, N. Y., on the second Tuesday in August, 1883. Arrangements have been made for the accommodation of guests, exhibitors, etc. Dr. Ambler, as Chairman of the Committee of Arrangements, will be at the United States Hotel, Saratoga, on Monday preceding the meeting.

For further information, address Dr. A. C. Rich, Saratoga Springs, or Dr. J. G. Ambler, 14 E. Forty-second Street, N. Y.

J. G. Ambler, *Chairman of the Committee of Arrangements.*

CALL FOR A DENTAL CONVENTION.

The dentists of the Northwest are cordially invited to meet at Fargo, Dakota, on Friday, July 27, 1883, at 10 o'clock A.M., for the purpose of organizing a dental society for this section of the country.

It is hoped that all practitioners who take an interest in matters relating to the advancement of the profession will be present, and present such papers or essays as they may choose upon any subject, so that we may have a profitable meeting. The railroads will furnish tickets to those who attend at 60 per cent. of the regular rate. The Continental Hotel at Fargo will give first-class accommodations at reduced rates. Come and aid in organizing the first dental society of the Northwest.

Louis Ottofy, Grand Forks.
Louis Davenport, Moorhead.
J. H. Spaulding, Fargo.
H. B. Ober, Fargo.

EAST TENNESSEE DENTAL ASSOCIATION.

The seventeenth annual meeting of the East Tennessee Dental Association will be held at Rogersville, commencing Tuesday, August 14, 1883, and continuing three or four days. A cordial invitation is extended to members of the profession to attend.

F. A. Shotwell, *Secretary*, Rogersville, Tenn.

EDITORIAL.

THE WEBB TESTIMONIAL.

We call attention to the following letter which we have received from Dr. George W. Field, London, Eng., with permission to publish it. It needs no comment:

Dr. J. W. White—

Dear Sir: I am greatly disappointed, not to say pained, to learn that the sum thus far subscribed to the Webb fund is so insignificant. When we take into consideration the self-sacrificing labors of our lamented friend, and that those efforts produced results which must prove beneficial and enduring to all earnest and honest practitioners in our speciality; also the large number of well-to-do men who would never miss ten or twenty dollars, as well as many to whom Dr. Webb was personally known; and last, when we remember how seldom it is that such a call has been made,—it is not saying too much when I intimate that we should raise at least $5000. In addition to my present subscription, I will be one of twenty-five men to subscribe $50 each; the amount to be invested, and the interest to be paid over annually to Mrs. Webb.

Yours truly,
George W. Field.

DENTAL LEGISLATION IN PENNSYLVANIA.

The following act in reference to the registration of dentists has been passed by the Legislature of Pennsylvania, and become a law:

An act for the registration of dentists, supplementary to the act entitled "An act to regulate the practice of dentistry and to protect the people against empiricism in relation thereto in the State of Pennsylvania, and providing penalties for the same," which became a law on the seventeenth day of April, one thousand eight hundred and seventy-six, providing for the registration of practitioners of dentistry and penalties for violations of the same.

Section 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same:* That it shall be the duty of any person practicing dentistry within this Commonwealth within three months after the passage of this act, and of any person intending to practice dentistry within this Commonwealth, before commencing the same, to have recorded in the recorder's office in the county in which he or she practices or intends to practice the diploma or certificate provided for in the act to which this is a supplement.

Sec. 2. Any person *beginning* to practice dentistry in this State after the passage of this act, having a dental diploma issued or purporting to have been issued by any college, university, society, or association, shall present the same to the State Examining Board provided for in the act to which this is a supplement for approval; such examining board being satisfied as to the qualifications of the applicant and the genuineness of the diploma shall, *without fee*, indorse the same as approved, after which the same may be recorded as aforesaid.

Sec. 3. Any person who is entitled to practice dentistry in this Commonwealth without a diploma or certificate under the provisions of the eighth section of the act to which this is a supplement, shall make written affidavit before some person qualified to administer an oath setting forth the time of his continuous practice, and the place or places where such practice was pursued in this Commonwealth, and shall within three months after the passage of this act have such affidavit recorded in the recorder's office of the county in which he is practicing, and it shall be the duty of the recorder to record such diplomas, certificates, and affidavits, in a book provided for such purpose.

Sec. 4. Any person who shall violate or fail to comply with any of the provisions of this act or of the act to which this is a supplement, or who shall cause to be recorded any diploma or certificate which has been obtained fraudulently, or is in whole or in part a forgery, or shall make affidavit to any false statement to be recorded as aforesaid, shall be guilty of a misdemeanor, and on conviction shall be sentenced to pay a fine of not less than fifty nor more than two hundred dollars for each offense for the use of the proper county.

Sec 5. All acts or parts of acts inconsistent herewith are hereby repealed.

DENTAL LEGISLATION IN MICHIGAN.

The following is the text of a bill to regulate the practice of dentistry in the State of Michigan, which recently became a law in that State:

"*The People of the State of Michigan enact*:

"Section 1. That it shall hereafter be unlawful for any person to practice dentistry in this State unless such person has received a diploma from the faculty of

a reputable dental college duly incorporated under the laws of this or some other State of the United States, or a certificate of qualification from the board of examiners provided for by this act; *Provided*, That the provisions of this section shall in no way apply to or affect any person who is now located and in actual practice in this State.

"SEC. 2. Said board of examiners shall be appointed by the Governor of this State, and shall consist of three practical dentists, who shall be regular graduates of a reputable dental college duly incorporated under the laws of this or some other State of the United States, or otherwise possess the necessary qualifications contemplated by this act.

"SEC. 3. Each member of this board of examiners shall serve for a term of three years, and until his successor is duly appointed and qualified, except in case of the first board; the members thereof shall serve respectively one, two, and three years, as specified in the appointment of the Governor.

"SEC. 4. The board of examiners shall be organized as follows: The member having but one year to serve shall be president of the board; the one having two years shall be treasurer, and the one having three years shall be secretary. The treasurer shall make and file with the Secretary of State a good and sufficient bond to the people of the State of Michigan in the penal sum of one thousand dollars, conditioned that he will well and truly pay over all moneys received by him as such treasurer in compliance with the provisions of this act, and otherwise faithfully discharge the duties of his office.

"SEC. 5. The board of examiners shall meet at least once in each year for the purpose of examining applicants after having given personally or by mail thirty days' written or printed notice to each practicing dentist in the State who has filed his name and post-office address with the secretary of said board. The said board is authorized to incur all necessary expenses in the prompt and efficient discharge of its duties, and pay the same with any moneys in the hands of its treasurer.

"SEC. 6. Each member of said board shall qualify by taking the oath of office prescribed by the constitution of this State and filing the same with the Secretary of State before entering upon the duties of his office. Should a vacancy occur in said board the Governor of this State shall fill the same by appointment.

"SEC. 7. Any member of said board of examiners may, when the board is not in session, examine applicants, and in case any applicant is found competent grant a license to him to practice dentistry in this State until the next meeting of the said board and no longer, upon the payment of the sum of three dollars; *Provided*, No member of the said board shall grant a license to one who has been rejected on an examination by the board.

"SEC. 8. Should any member of said board be unable to attend at the meeting of the board for the examination of applicants he may appoint in writing a substitute who shall have the same power on the examination that the member appointing him would have if present; *Provided*, Such substitute be a person eligible to be a member of said board within the provisions of this act; *And provided further*, That the appointment of such substitute be by and with the written consent of the other members of the board.

"SEC. 9. Each applicant shall, on receipt of a license to practice, pay into the treasury of the board the sum of ten dollars, which shall constitute a fund to defray the expenses of the board; and each member of the board shall receive therefrom the sum of three dollars per day for services rendered as such examiner. The said board shall keep a list of the names of all persons to whom licenses have

been granted under the provisions of this act, and also of all persons practicing dentistry in this State in a book provided for that purpose with the names arranged in alphabetical order.

"Sec. 10. Any sum in excess of one hundred dollars which, under the provisions of this act, may accumulate in the treasury of said board, shall be paid by the treasurer thereof into the treasury of this State.

"Sec. 11. Each person now engaged in the practice of dentistry in this State shall within ninety days after this act takes effect send an affidavit to the secretary of said board setting forth his name, place of business, post-office address, the length of time he has been engaged in practice in this State, and if a graduate of a dental college state the name of the same, and also pay to the treasurer of said board the sum of twenty-five cents, and on failure to comply with the provisions of this section he shall be required to appear and be examined by said board.

"Sec. 12. Any person who shall practice dentistry in this State in violation of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than twenty-five dollars nor more than one hundred dollars, or sentenced to imprisonment in the county jail for a period not exceeding ninety days, or both such fine and imprisonment in the discretion of the court; *Provided*, That nothing in this act shall be construed so as to interfere with physicians and surgeons in their practice as such.

BIBLIOGRAPHICAL.

A Practical Treatise on Impotence, Sterility, and allied Disorders of the Male Sexual Organs. By S. W. Gross, M.D. Second edition. Philadelphia: H. C. Lea's Son & Co., 1883.

In this, the second edition of an already well-known work, we observe but few alterations or additions. The author still adheres to his views concerning the close relation between masturbation, urethral stricture, and certain cases of impotence, but advances no further corroborative testimony. We would be glad to hear of anything which could act as an additional deterrent to those who are victims of this unmanly habit, but at present we are compelled to class stricture of the urethra produced by masturbation among the many fictitious or greatly exaggerated diseases ascribed to the same cause by those alarmists who make capital out of the fears of young men. Certainly, if it is ever due to onanism, it is as an altogether exceptional occurrence. Sir James Paget's dictum that, in the great majority of cases, the habit is not necessarily attended by any insuperable or very grave disturbance of health, but is often rather a symptom than a cause of disease, has, so far as we know, never been successfully controverted.

No mention is made of the occasional association of reflex excitability of the genito-spinal center with peripheral irritation, such as that caused by the difficult eruption of a wisdom-tooth, or

as seen more frequently in young children, in the priapism, picking at the penis, etc., observed during dentition.

The general plan of the book is comprehensive, the subject is considered with great fullness, and the language is well chosen and easily understood. Numbers of cases are given illustrating the different varieties of sterility and impotence.

OBITUARY.

FREDERICK H. KNAPP, D.D.S.

DIED, in New Orleans, Louisiana, Saturday, June 23, 1883, of heart disease, Frederick Hopkins Knapp, D.D.S., in the sixty-eighth year of his age.

Dr. Knapp was born at Guilford, N. Y., May 17, 1815, his father being a prominent physician of that town. He was educated in Guilford and studied law with his brother-in-law, the late Hon. Daniel S. Dickinson, at one time United States Senator. In 1834 Dr. Knapp adopted the dental profession, and attended lectures at the Medical College of New York, there being no dental colleges in the country at that time. In 1835 he went to Baltimore, where he practiced five years.

In 1840, being troubled with a pulmonary complaint, by the advice of his physicians, Dr. Knapp spent several months in Havana, Cuba, practicing his profession there. His health improved so much that he decided to locate his office in New Orleans, where he was one of the oldest established dentists and almost uninterruptedly in practice until the time of his decease. In 1861 he was a member of the Secession Legislature of Louisiana. He was a man of elevated mind, and attained high social and professional relations. He leaves a widow, and one son, Dr. F. J. Knapp, now practicing dentistry in New Orleans.

At the time of his death Dr. Knapp was president of the Louisiana State Dental Society, which, at a special meeting on June 26, passed resolutions expressive of regret at the loss of their president and a zealous member, in whose death the community was deprived of a good and upright citizen. Sympathy was expressed with the bereaved family, and the resolutions were ordered to be spread upon the minutes and published.

DR. JAMES E. MILLER.

DIED, in Brooklyn, N. Y., June 6, 1883, of pneumonia, Dr. James E. Miller, in the sixty-fourth years of his age.

Dr. Miller was born in Amawalk, Westchester County, N. Y., January 7, 1820. He received his education at the district academy

of his native village, and, being of an ambitious and industrious temperament, went to Brooklyn in 1839, where he taught school for a time, but soon engaged in the study of dentistry with Dr. Martin K. Bridges, one of the pioneers of the profession there. Dr. Miller early established himself in a practice which, in the course of years, became one of the most extensive in Brooklyn. He was at different periods associated in business with several prominent dentists, and at the time of his death with Dr. Charles C. Allen. He took a prominent part in the opposition to a bill introduced into the New York Legislature a few years ago, which had for its object the disqualification of members of the dental profession who were without diplomas, and it was mainly through his efforts that the bill was defeated. He was active in many public reforms, especially in reference to cruelty to animals; was a vegetarian in the strictest sense; was at one time a member of the Society of Friends, and his funeral services were conducted in accordance with the rites of that sect. In recent years he held some peculiar religious views, but was regarded as man of sterling character. He was a widower, without children, and left a large estate.

T. C. TIERNEY, D.D.S., M.D.

Died, at New Rochelle, N. Y., on the night of July 5, 1883, T. C. Tierney, D.D.S., M.D., in the thirtieth year of his age.

Dr. Tierney was graduated at the New York College of Dentistry in 1875, and in 1880 he received his degree in medicine at the University Medical College of New York.

Of an active temperament, and an enthusiast in his profession, Dr. Tierney gave brilliant promise of attaining eminence in the calling he had chosen, while his amiable disposition and spotless character won for him the respect of those with whom he came in contact, both socially and professionally.

His funeral was largely attended from St. Matthew's Church, New Rochelle.

PERISCOPE.

Characters of the Teeth in Arthritic Diathesis..—Dr. Duckworth began by saying that, although it was the fashion of the present day to disbelieve in diatheses, he was himself a firm believer in their existence. He believed that there existed an "arthritic" habit of body, or diathesis, and that this comprised at least two branches—the rheumatic and the gouty. These were essentially distinct; they might be mixed, but one would not produce the other. The rheumatic diathesis was more widely spread than the gouty, but

the latter was most common in the south of England, and especially in London. The result of a somewhat extended series of observations, made with no other view than to record exact facts with reference to this disease, had convinced him that the teeth of the gouty were, as a rule, remarkably strong, well enameled, enduring, and remarkably free from decay. On this point he differed entirely from the opinions expressed by Dr. A. Carpenter in a paper recently read before the society. Dr. Carpenter's statement that gouty people were specially prone to caries might be true of those who lived carelessly and intemperately; but he held it to be an undoubted fact that persons who inherited gout but were themselves temperate, of whom there were many, had generally strong and sound teeth. The modifying influence of a mixed diathesis, especially the existence of a strumous taint, would account for most of the exceptions to this rule. Dr. Duckworth then referred to the tendency which existed in persons of gouty inheritance for the teeth to be worn down, so as sometimes even to open the pulp-cavity; he had never heard this satisfactorily explained. Another peculiarity of such people was the tendency to shed perfectly sound teeth, the loss being due to a process of absorption of the alveolus. Gouty people were no doubt liable to attacks of alveolar periostitis, but he knew of no careful observations confirming Dr. Carpenter's statement that "lithate of soda was deposited in the circumdental membrane." The characters of the teeth in persons of the rheumatic habit of body were certainly less distinctive than those which could be noted in the gouty, but as a rule such persons had strong, well-enameled teeth. Dr. Laycock, of Edinburgh, had called attention to one remarkable exception to the rule that the teeth of persons of the arthritic diathesis were large and regular. This was a tendency for one or more of the lower incisors to be pushed forward, an irregularity to which the name of "buck teeth" had been given. It might not appear till middle life, and he was quite at a loss to suggest any explanation for it; he could only call attention to it as a well-observed fact. In conclusion, Dr. Duckworth complimented the dental profession on the progress it had made in its endeavors to repair the ills consequent on habits of luxury. It was a great thing that the study of dental pathology was now founded on a thorough knowledge of the anatomy and physiology of these organs; it would be a further important step when the great doctrines of diathetic predisposition and of scientific physiognomy were carefully worked out and applied to practice. He hoped that his communication might have contributed something to this end, or might at least enlist the interest of dental surgeons in the subject.—*Reports Odontological Society of Great Britain, in Med. Press.*

Diseases of the Tongue.—* * * As I have just hinted, the conditions which favor the development of fur on the tongue, are briefly those of rest. If we can fully realize this fact, it will help us to the explanation in a very simple manner of most of the morbid conditions of the tongue met with in acute diseases. When the tongue is quiet, the papillæ grow freely, their hairs accumulate epithelium, and on the epithelium colonies of micrococci flourish. Large allowance must be made for individual peculiarity, for it is only in those

in whom the filiform papillæ are abundant and large that any development of fur can possibly take place. It is well known that most persons have more or less coated tongues before breakfast, and that the taking of a meal rubs off the fur and cleans the tongue. It is also well known that when the tongue cleans it usually does so from its end and sides; leaving the middle of the dorsum and especially the posterior part still covered. The explanation of this is easy, for the parts which clean first are precisely those which are most rubbed against the teeth and hard palate.

It is very common to see tongues which do not clean in the manner just described, but in which one longitudinal half of the tongue is clean while the rest is furred. In these cases the line is never abrupt in the middle, but it is usually to be noticed that considerably more than half is clean and less than half or, it may be, a mere streak on one side remains furred. The explanation of this condition is I believe always to be found in the fact that the patients in whom it is observed eat chiefly or only on one side of the mouth.

It does not matter in the least what the cause of the one-sided mastication may be, whether there is a tenderness or the absence of teeth, the result is just the same. If a patient eats on one side only of his mouth he rubs that side of his tongue much cleaner than the other. I am, of course, aware that one of my distinguished predecessors in this chair, the late Mr. Hilton, an observer and reasoner from whom I would differ with great diffidence and reluctance, propounded another theory, and that his suggestion has been widely accepted.

Mr. Hilton's observations of the facts were exactly the same as my own, at any rate thus far, that he noticed that those who had aching or tender teeth got the tongue furred on the side of the bad tooth. His explanation was that the fur was produced in a reflex manner through the influence of the fifth nerve, and was an instance of disturbance of function and nutrition by nerves.

Apart from the consideration that it is desirable to avoid calling to our aid nervous disturbances concerning which we can prove nothing, when they are not required, I must contend that the simple mechanical explanation which I have given covers the whole ground, and accounts for a large number of cases which the other would fail to explain. It is certainly not the fact that painful teeth are present in all cases of unilateral furring of the tongue. In many, I think in the majority, the condition is rather the absence of teeth.

The condition of accumulation of white or dirty-brown fur in the back part of the mid-dorsal region is exceedingly common. It is to be explained in the same manner that we have suggested in the case of unusual growth of the filiform papillæ in this region, being, indeed, to some extent, the same thing. This is the part of the tongue the best protected from pressure and friction, and upon which both papillary and fungoid growth takes place, therefore, most easily. When fur collects in patches in local regions elsewhere than in the middle, some local peculiarity in the mouth is to be suspected. There may be a sore on the palate, making it painful to apply the tongue to that part, or there may be an aching tooth, or a gap in the row of teeth, or a sharply broken stump. Any of these conditions may favor the occurrence of patches of fur, but such patches are seldom well defined or very conspicuous.

Absence of fur—a simply clean tongue—is indicative, usually, of a good appetite and free mastication in all parts of the mouth. It generally implies, in addition, that the development of the filiform papillæ is only moderate. On the other hand, an habitually foul tongue, without dyspepsia or ill-health, usually indicates an excessive growth of these papillæ and their appended processes.—*Jonathan Hutchinson, F.R.C.S., etc., before Royal College of Surgeons of England—Medical Press.*

Cerebral Origin of Dental Decay.—Hard-working students force the growth of their intellectual capacity at the expense of their teeth. At all events that is the belief of Drs. Sitherwood and Hanlan, who have written on this matter in a recent number of the *Journ. de Médec. et de Chir. Prat.* It is said that the teeth undergo a rapid alteration in students who labor long, and that on the cessation of the hard work the dental disease dies away. We are quite prepared to admit that there may be some truth in these assertions. The teeth have been known to become loose and drop out apparently as a direct consequence of that protean disease, tabes dorsalis. But it is probable that even truthful Nature will be found to draw the line at the wholesale accusation of her nervous system. Why, we should have thought that the dental arches were as much without the pale of action of the much impeached mental organs as the nails and the skin. We have not heard or read whether the epithelial desquamation or the rate of growth of nails is more rapid or more perverted in beings of much cerebral action, as compared with those of their fellows who work less with their quiet brains. Explanations of this alleged fact concerning the teeth have been mentioned by a recent writer in *L'Union Médicale.* It is thought that the brain, when overworked, steals all the phosphates, and leaves none for the teeth, or else that a deterioration of the general health is brought about by the excessive study. Now, it is certainly a matter for consideration whether excessive mental work *per se* is capable of inducing serious disease. Side by side with natural mental life there probably goes on more or less unhealthy action, which bears pretty much the same relation to the former as the latter does to the friction on a steam-engine. What is friction in the engine is anxiety or worry in the man. It is the friction which destroys the physical basis of the engine, and it is the anxiety that wears out the material structure of the man. So, then, all cerebral action is accompanied by the inevitable residue of anxiety or whatever else we choose to call it, but this residue may be lessened by various circumstances, and may be augmented by many conditions; and so it is that of two men of equal original health and equal original powers, but of dissimilar environment, the one succumbs because the heat of frictional anxiety has consumed him, the other lives longer because the obstacles to his vital acceptation of the first law of motion have been reduced to a minimum.—*The Lancet.*

Promotion of Osseous Development.—Dr. Thorowgood pointed out that the composition of the bones and teeth was practically identical, the chief difference being the larger proportion of inorganic matter in the teeth. The analysis showed that a considerable

quantity of mineral food was required for the nutrition of these tissues. The mere administration of the necessary lime-salts was, however, by no means the only thing to be considered in striving to improve osseous development. Thus, in rickets, with an evident deficiency of lime-salts in the bones, there was an elimination of from four to six times the normal amount of lime in the urine, showing that the defect was in the process of assimilation. For the dentist, the most serious condition in children was one of acid dyspepsia: the child's breath had a sour smell, tongue furred, with red papillæ showing through, appetite often voracious, and bowels confined or irregular. To give a big-bellied, pale-faced child in this condition phosphate of lime and iron would only make him more uncomfortable; but give him alkaline aperients, regulate his diet, cutting off excess of starch and sugar, order exercise, salt-water baths, etc., and then administer the specific remedies indicated. Of these, the most useful were the soluble hypophosphite of lime and the chloride of calcium; either of these might be given in doses of two or three grains in glycerin and water. The lacto-phosphate of lime was also a valuable remedy. Diet was most important; the child must be taught to eat slowly; brown bread and Scotch oatmeal would suit some children, and "seconds" flour was preferable to "best whites." By this line of treatment the child would be brought into a condition in which the dental surgeon could work on the decayed molars with some prospect of his work remaining a lasting proof of his skill. Dr. Thorowgood, in conclusion, touched upon the subject of infant feeding.

An interesting discussion followed, several members pointing out that, owing to the early development of the teeth, and to the fact that, when once formed, they did not alter appreciably, any treatment intended to improve their condition must be effected through the mother, so as to influence the child during the periods of pregnancy and lactation.—*Reports Odontological Society of Great Britain, in Medical Press.*

Development of the Lower Maxilla.—Mr. J. B. Sutton read a paper on this subject. After showing that great differences of opinion had existed among anatomists as to the mode of development of the lower jaw, even so recent an authority as Professor Humphry considering that it was usually formed from one center, Mr. Sutton described its growth from six centers, illustrating his description by means of specimens. The first center to appear was that which formed the greater part of the body of the bone; next came centers for the condyle, coronoid process, and angle, then one in front known as the "mento-Meckelian." These united, and then on the inner side of the mass thus formed (the dentary), a thin plate of bone appeared at right angles to it and quite distinct. This was the "splenial," and above it supported the dental follicles, whilst below it were Meckel's cartilage and the inferior dental nerve. A little later, the splenial sent down a process from its inner edge which inclosed the nerve, uniting below with the outer plate, or dentary, with which it also united by its outer edge above the nerve. The descending process of the splenial formed the inner wall of the maxilla, and a growth upward from it formed the inner wall of the alveoli. After the

fourth month, all trace of the separate parts was lost, and the bone assumed the condition which it presented at birth. Mr. Sutton next referred to Serre's "*loi de conjugaison*"—*i. e.*, that foramina in bones are always formed by the apposition of two or more distinct bones, or of two or more distinct centers of ossification, and showed that this afforded strong and firm evidence of the compound origin of the lower jaw, which was fully confirmed by the results of actual investigation. Lastly, he pointed out the homologies of these centers in the compound jaws of fishes, amphibia, and reptilia, showing that those parts which in man united at so early a period that their very existence had been doubted, in some of the lower vertebrata remained separate throughout life, and that thus the evidence of comparative anatomy also tended strongly to confirm the compound origin of man's lower jaw.—*Reports Odontological Society of Great Britain, in British Med. Journal.*

Treatment of Abscesses by Injections of Alcohol.—M. Assaky reports fourteen cases of chronic abscess treated after Professor Gosselin's method. This method consists in the injection of alcohol, and is based on the antiseptic properties of this agent, and its action on inflamed or suppurating tissues. An incision about a third of an inch in length is first made, and the abscess-cavity, after its contents have been discharged through this opening, is washed out with alcohol of 90 deg. strength. The quantity of injected alcohol varies according to the dimensions of the abscess. It is necessary that the quantity be sufficient for application to the whole of the internal surface of the cavity. The seat of the emptied and injected abscess is then covered with a dressing of camphorated *eau-de-vie.* On the following day there is an abundant secretion of dark-colored and thick fluid. The secretion diminishes in quantity from day to day, and, as it diminishes, its density becomes lower, and its color lighter. In the ultimate stage of the treatment it presents a serous, transparent fluid resembling lymph. When, on pressure, this serous fluid only can be forced out, and in small quantity, the abscess is on the point of becoming healed, there is no longer any cavity, the walls are adherent to each other, and there remains but the small incision, which closes in the course of two or three days. This method, M. Assaky states, has the following advantages: it necessitates only a small wound of the integument, and so there is less risk of the ordinary complications of wounds, and the cicatrix is small and is hardly apparent. The superiority of the method, however, consists chiefly in the considerable abridgment it effects in the duration of the treatment of chronic abscess. It is very evident, M. Assaky states, that the number of days occupied in the healing of an abscess by this method must depend on the extent of the sac. But all other things being equal, the duration of treatment, in a case of abscess punctured and injected after Gosselin's method, is much less than that of one submitted to ordinary methods. In small abscesses, and those of medium size, cure may be effected between the second and seventh days. This treatment may be applied to any chronic abscess that is circumscribed, and consists of one regularly-shaped cavity. In most cases, one injection only of alcohol is necessary; but when the abscess is very large, two or three may be required. The indication for a

repetition of the injection would be a persistent purulent discharge. The injection of alcohol into the inflamed tissues, it is asserted, is not very painful. The pain varies with the sensitiveness of the patients. One will complain of lancinating pains, and of burning or pricking sensations, which will last from ten minutes to an hour, whilst another will not complain of any painful sensation. Sometimes, though rarely, the injection of alcohol is followed by more or less extensive sloughing of the skin. This result has seemed to M. Assaky to have been usually associated with too long delay on the part of the patient in applying for treatment, so that the seat of the abscess has become much inflamed, and the skin hot, red, and very tense. Associated with this condition, there may be a further cause in some faulty diathetic condition of the patient.—*The Cincinnati Lancet and Clinic.*

Ranula Treated by a Plastic Operation to Secure Permanent Drainage.—In a case of large double ranulæ, which constantly refilled, despite incision and partial excision, Dr. T. F. Prewitt finally succeeded in preventing reaccumulation of fluid by plastic procedures, which established permanent openings into the mouth. He clipped away the mucous membrane from a portion of the cyst wall, incised the cyst, and then everted the margins of the incision, which he sutured to the border or stump of mucous membrane surrounding the denuded space. Thus, by the folding outward of the cyst wall, two raw surfaces were placed in apposition, and an opening was left between the cavity of the ranula and the mouth. Both tumors were treated in the same manner. Since the operation the tumors have not refilled, because constant discharge of fluid occurs into the mouth. Previously they rapidly redeveloped after evacuation, and once nearly produced asphyxia.—*Medical News.*

Hypertrophy of One Ramus of the Lower Jaw.—Mr. Christopher Heath showed a young woman, aged thirty-six, suffering from this condition, and gave the following history: At the age of twenty-five she had an attack of left hemiplegia, the face being affected as well as the limbs. The limbs soon recovered, and the face probably did so also to a great extent, but ever since then the condition now present had been gradually coming on. It was evident that the right side of the chin was very much thrust over, but this was due entirely to hypertrophy of the left ramus, the body being symmetrical on the two sides; the condyle was enlarged, and the movements of the jaw were much restricted. He referred to the drawing of a very similar case in a woman of the same age in Dr. Robert Adams's "Atlas," but in this instance there was distinct rheumatoid arthritis of one hand and one foot, of which there was no sign in his own patient. He proposed to remove a portion of the hypertrophied ramus, so as to enable the teeth to be approximated. (In connection with this patient Mr. Nathaniel Stevenson exhibited a very minute incandescent electric lamp attached to the end of a catheter, through which the wires passed to the battery; it was admirably adapted for illuminating the mouth in such a case as this.)

Mr. Roger Williams referred to a specimen of exostosis of the angle of the jaw which he had seen.

The president noticed that there was no great enlargement of the articular end of the bone in this patient, as in Dr. Adams's case.

Mr. Croft asked Mr. Heath whether he thought this was a case of hypertrophy rather than of osteitis deformans, and he inquired whether there had ever been any pains in the jaw. As to the pathology of this affection, without examining the vascular and nervous supply (which could not be done in the present instance) it was difficult to form any opinion.

Mr. Heath, in reply, said there had been no pain in the jaw. He thought the bone might be unusually dense. He had had an opportunity of showing the patient to Sir James Paget, who pronounced it not to be a case of osteitis deformans, an opinion which might be accepted as final. He hoped on a future occasion to bring the portion of bone removed before the society.—*Reports Pathological Society of London, in Med. Times and Gazette.*

Effect of Paralysis of the Palate on Articulation.—Dr. Solomon C. Smith showed that the palate-muscles acted as a valve, stopping the exit of air through the nose, and thus permitting the air to be compressed in the mouth so as to be emitted with the degree of force necessary for the production of most of the consonant sounds. He stated that paralysis of the palate diminished the force of all the consonant sounds, except the resonants and nasals, and entirely abolished those which required for their production the greatest amount of compression of the air in the mouth, viz., the explosives; and that the labial explosives *p* and *b* were changed into the labial resonant *m*, the dental explosives *t* and *d* being converted into the dental resonant *n*. Cases were related illustrating these points.—*British Med. Journal.*

Hemorrhage after Tooth-Extraction—Transfusion.—The *Revue Odontologique* for April contains an interesting account of a case of almost fatal hemorrhage after tooth-extraction. The patient, a young soldier of twenty-two, with a marked history of hereditary and collateral hemorrhagic diathesis, was admitted to the Hôtel Dieu, and had some molar roots removed without telling the house-surgeon any facts as to his history, and the operation which was performed was followed by profuse hemorrhage of a dark color, without clots. Next morning plugging with lint and perchloride of iron was tried without permanent effect. On the third day actual cautery was tried at the bottom of the socket, followed by plugging with compressed sponge, the jaws being fixed by a bandage, and ergotine subcutaneously injected. On the fourth and fifth there was no hemorrhage; injections continued. Next day (the sixth) the bandages, etc., were removed, owing to sloughing and suppuration of the gums, and from the raw surfaces profuse bleeding recurred, and no local measures were effective to arrest it. On the eleventh day the patient was moribund, and it was decided to try transfusion of blood. After plugging the socket again, 100 grammes of blood were transfused into the cephalic vein, with immediate relief to the patient. In three hours the trouble began again and continued till next morning, when, after a second transfusion, the patient began to revive, although an access of syncope nearly proved fatal during

the operation. However, the hemorrhage was stopped, and in six weeks the patient was discharged cured.—*The Lancet.*

Spontaneous Fracture of the Teeth.—Mr. Alfred Coleman related the particulars of four cases which he had met with in the course of his practice, in which fracture, or splitting of teeth had occurred without any apparent assignable cause, and referred to others recorded in the society's "Transactions." It had been suggested that the splitting was due to accumulation of gases in the pulp-cavity; but he (Mr. Coleman) thought it was in some way connected with the calcification of the pulp, which he had found to be a constant concomitant, and he gave some reasons in support of his hypothesis. In the discussion which followed, all the speakers were of opinion that, in these cases of so-called spontaneous fracture of the teeth, the accident was always due to some form of mechanical violence, but that the real cause was overlooked or forgotten, owing to the fact that a considerable time might elapse before any symptoms appeared to call attention to the fracture. Cases were related by Messrs. Charles Tomes, Hutchinson, and Horn, in which there had been complete absence of symptoms, for periods varying from three months to nearly two years after the occurrence of such accidental fractures. Mr. Hutchinson also suggested that the calcification of the pulps, which was generally present, was due to irritation set up by the fracture, and was, therefore, a result of the accident, and not the cause of it.—*Reports Odontological Society of Great Britain, in British Med. Journal.*

Dental Legislation in France.—A somewhat novel society has been founded in Paris by no less notable personages than MM. Victor Hugo, Clémenceau, Barodet, Henri Rochefort, and other Republican senators and deputies under the title of "Ligue de l'Intérêt Public Société Protectrice des Citoyens contres les Abus." The energies of the association are at present being directed towards the establishment of a system of dental inspection in all the primary schools of Paris; and a petition has been laid before the Municipal Council in furtherance of this object. The memorialists feelingly call attention to the fact that the teeth of boys in *lycées* are regularly looked after at the cost of the State—"that is, at the expense of the working classes," and they consider that the pupils in poorer schools are entitled to the same privilege. It is proposed, therefore, to adopt a system which is said to be working with the happiest results at Cherbourg, and at Verviers, in Belgium. School-boys and girls are to pay four visits a year to official dentists, who will become responsible for the good condition of their teeth, and perform whatever extractions may be considered necessary, gratis. The visits are to be compulsory; and by a thoughtful arrangement, which is sure to please the young people, they are to take place on Sundays, so as not to interfere with lessons. Parents who allow a child to miss one of the quarterly inspections on the insufficient grounds that there is nothing the matter with its teeth, will be punished by finding its name erased from the dentist's list for six months. On a repetition of the offense the child will be cut off from the benefits of free dentistry forever. A powerful committee has been appointed to assist the passage of this novel measure through the Municipal Council.—*Med. Times and Gazette.*

HINTS AND QUERIES.

My son, aged fourteen, in good health, and well developed, height five feet eight inches, weight 119 pounds, has not yet shed his deciduous upper laterals. His uncle, aged forty, still retains his deciduous laterals. The lad's sister, aged ten, showing the same tendency, was encouraged to loosen these teeth with her fingers, in which effort she partially succeeded. The looser one was drawn last May, and was found to have quite a long root. The permanent lateral has since erupted and is now about half way down. The other lateral is slightly loose, but there is no other sign of its successor. The teeth of the lad referred to are not loose. All his other teeth were shed and replaced in due time and order. Query: Had these teeth better be extracted or allowed to remain, in view of the fact that his uncle has retained the corresponding teeth to the age of forty?—E. S. J.

A lady patient of mine has been troubled for the past few years by pus oozing about the root of the right lower central incisor, and now escaping by the side of the right lower canine. The teeth appear strong and sound, but sometimes the front one is a little loose. The lady, while painting, was in the habit of putting the brush to her mouth to wet it. As she enjoys good health and shows no symptoms of lead-poisoning, can the lead have caused this, and how is the trouble to be corrected without injuring the pulp or pericementum?—J. S. A.

If H. R., in the Dental Cosmos for May ("Hints and Queries"), will examine his patient's mouth, he will probably find her back lower teeth are wanting; consequently all the biting and masticating is done in front. Pressure always produces absorption by retarding the circulation. Remedy: Insert lower back teeth, and advise your patient not to wear her teeth during the night. All plates of whatever material produce the same effect under similar circumstances.—A. F. Davenport.

In reply to numerous letters of inquiry regarding medicaments for the relief of "pulpitis," I would say that the list at present comprises oily carbolic acid; acetate of morphia paste; iodoform paste; oil of cloves; oil of cajeput; oil of eucalyptus; oil of cinnamon; oil of hamamelis; tinctures of arnica and opium (equal parts); tincture of benzoin; Canada balsam; balsam of Peru; aconitia ointment (afterwards carefully removed); spirits of camphor; fluid extract of piscidia erythrina (Jamaica dogwood); and solution of hydrate of chloral (water f℥i.; chloral ʒiij).

Creasote is now referred to as a medicament of the past, disagreeable both in odor and taste, and usually inflictively escharotic in its application, and is accredited with the accomplishment of no results which cannot be obtained by means which are much more acceptable.—J. Foster Flagg.

Principles and Methods.—In a late number of one of the dental journals I noticed an article on "Impressions and Other Things." Judging by what one often reads, it would seem as if nothing were certainly known or definitely settled on such subjects; but that the generally recognized principles and usually admitted facts were mere theories and matters of opinion. There is, of course, much debatable ground on all subjects relating to dentistry, and much room for the exercise of preferences, and even prejudices, as to methods; but it appears from some of the discussions that certain established principles are of less consequence

than certain favorite methods. Yet it must be admitted that personal peculiarities and long practice with methods that are in the minority produce results that are surprising, but after all only demonstrating the great difference in the natural ability and acquired skill of different men in various directions. Perhaps it would not be too much "vain repetition" to summarize what is generally regarded as at least the first chapter of the essentials of prosthetic dentistry.

As to impression material, though this subject is almost threadbare, we cannot ignore it. The essential qualities of impression material are these: It must be soft; must take a sharp imprint; remain where placed; set hard, and when necessary must fracture sharply, with but little force. Plaster has all these qualities in a high degree. Both wax and modelling composition can be made soft enough, but they will not take so sharp an imprint as plaster; are slightly elastic and decidedly pliable; will not always remain where placed, and, when there is decided undercut, they cannot be removed from the mouth without dragging or bending. But wax and modelling composition will, in certain cases, compress soft tissue more efficiently than plaster; and for that reason these are sometimes the best that can be used in lower cases, where the ridge is much absorbed and more or less imbedded in soft tissue. But in all other cases, full and partial, plaster is the most reliable material. Of course, good fitting plates were made before plaster was used for taking impressions, just as good cohesive gold fillings were inserted by skillful operators before the introduction of the rubber-dam. In order to obtain the best results with plaster, the impression-cup should not only have the general shape of the parts, and be about two lines larger all around, and the same distance from the palate, but should be built up with wax across the rear to compress the soft tissues. When plumpers are required, a larger (and sometimes a much larger) cup must be used, to press up and obtain an accurate imprint of the yielding membrane and muscles connecting the cheek with the gum.

After years of theorizing and experimenting with "double action" air-chambers, disks, and the like, this principle is now recognized as the fittest to survive: a dental plate fits best when it rests equally on the hard and soft parts of the alveolar process and palate. In all cases in which the parts are comparatively and uniformly hard a perfect impression with a shallow air-chamber, chiefly to prevent the plate from rocking on the median ridge, is all that is required to secure the best adaptation and adhesion of a superior denture. But the best possible fit does not, in the majority of cases, result from a perfect impression of the parts as they are, but in addition requires compression of the soft tissues. This is attained either by having the impression-cup and material properly shaped and prepared, or by scraping the hard parts from the impression, and the soft parts from the model; but instead of scraping the impression, two to four thicknesses of heavy tin foil may be placed on the model to relieve the pressure on the hard parts. As the amount thus removed is uniform and the shape of the parts is preserved, this method is perhaps the best that can be adopted. Instead of scraping the model as nearly as possible to the depth of the soft tissues, these parts may be compressed by a plaster impression properly taken, and a line, very shallow in the center, and deeper and wider where the parts are softest, may be cut across the rear of the model. The best results of this method, which applies especially to all cases where the soft parts are deep and extensive, are secured in this manner: place a ridge of wax three lines wide across the rear of the cup; warm slightly; press up against the parts firmly; remove and trim out the wax in the center and at the corners of the cup, so that pressure will be strongest where it is required. Now, fill the cup with the proper quantity of plaster, which, though mixed mod-

erately thick, must be soft, and press up evenly and firmly. As the wax, which is now hard, presses up and slightly stretches back to the soft parts, the plaster will copy them accurately in that position. If the plaster is of the right consistence, and the cup has the required width at the back part and is placed properly in the mouth, this method will give better and more certain results than can be obtained by the method of scraping the model. This latter is a good method, and in the hands of some may be the best; but when the soft parts are deep and extensive, and a swaged plate is not to be used, there can be no certainty as to the proper amount to be removed.

The principle of scraping the impression, and particularly the model, applies also to lower cases, especially to those having an undercut along and above the mylohyoid ridge. It has been my experience that no impression material can always be relied on to secure the full benefit of this undercut. In several of my recent cases, though the impressions were sharp and full, I scraped the model more than seemed to be necessary, and yet, though it required a little force to put the plates in position, they do not exert any noticeable pressure, and are worn very comfortably.

But in those comparatively rare and difficult upper cases in which the alveolar border has been greatly absorbed and covered more or less deeply by loose tissue, relieving pressure on the hard parts and producing it on the soft parts will very seldom secure sufficient adhesion of the denture; so that the only resort is a vulcanite plate with a flexible rim.

In regard to vacuum chambers, it may be briefly said that experience has fully demonstrated that they can be used with decided advantage in most full and many partial sets, because they make the adhesion of the plate strongest at first, and that is just when strength of adhesion is most needed. But many vacuum chambers are too large, and very many are much too deep, thus causing diseased conditions of the mucous membrane, which often counterbalance all the good they did at first.—A. G. Bennett, D.D.S., Emlenton, Pa.

Dental College of Paris.—In the April number of the Dental Cosmos, page 184, I notice, in an interesting letter from Dr. E. A. Bogue to the New York Odontological Society, a paragraph speaking about the Dental College of Paris. I feel sure your pages are open to those who claim space in them for truth and justice. I therefore shall feel obliged by your publishing the following explanation:

Dr. Bogue has been misinformed when he makes the statement that the college was founded by "workmen and apprentices, with the help of a few others." The institution was founded in 1880 by subscription, and the majority of the dentists of Paris and France were its subscribers. Of one hundred and fifty subscribers, all dentists, six were not established. The faculty counts among its professors able and prominent dentists. Dr. Emmanuel Lecaudey, a dentist occupying a very high position in Paris, is the president of the college, and the rest of the faculty, with the exception of the professor of operative dentistry, are doctors of medicine, holding high rank in their profession. The institution has seventy-five students, which, considering its short existence, is a very good beginning. It has eight large, well-ventilated rooms, with excellent light, and has twenty operating chairs, together with all the new instruments and appliances for the use of the students. At the inauguration of the last session Dr. Trélat, the eminent surgeon and one of the professors of the Faculty of Medicine of Paris, presided at the opening exercises.

The gentlemen connected with this institution are imbued with no motives of gain, and the college is not dominated by any group or any single individual, but

is an institution open to every one who desires instruction in dental surgery. It is to be hoped that the French government will pass a law regulating the practice of dentistry, but I am afraid the day is far distant. Project after project has been sent in by other societies, but we are as far as ever from regulation. As an example of free institutions existing without the support of the government, the École Central of Engineering remained a free institution for twenty years before it was recognized by the French government.

In conclusion, let me say that every means is being used to make this one of the first schools in Europe, and although it possesses some enemies, I have no doubt or fear of its ability to surmount all obstacles.—M. M. LEVETT, D.D.S., *Professor of Operative Dentistry at the Dental College of Paris.*

WHO DID IT FIRST?—In making my monthly pilgrimage through the dental journals last evening, I came upon some comments in the June number of the *Ohio State Journal of Dental Science*, from Dr. J. F. Siddall, about his "hickory pin." The idea has dawned upon him of the possibility of driving the pin into the pulp-cavity with a living pulp. Until within a year I did not suspect that it had been done *as a practice;* yet I remember, as others will, that Dr. Atkinson, some twenty years ago, before the Brooklyn Dental Association, related his experience in connection with the setting of pivot-teeth. He said he had cut off the fragment of the crown and driven the hickory pin, dipped in creasote, into the pulp-canal with a living pulp there, and he had found in after years (having occasion to repair the operation) the stump end of the pulp alive. It seemed, at the time, almost incredible to me and to many others. We have grown since that time.

The practical application of this method first attracted my attention and interest last summer during a call upon Dr. C. M. Richmond. He demonstrated the operation to me by cutting off a portion of a front crown and "knocking out the pulp," as he termed it. He was preparing to set a crown. He said, "I will show you that I can, and do as a practice, make it a comparatively *painless* operation." He first girdled the crown with a thin disk on the labial and palatal sides; then, with an excising forceps, clipped it off; and immediately, with an orange-wood stick prepared to a slender point, somewhat conforming to the pulp-canal, and dipped in carbolic acid, dextrously tapped it into the canal with a light mallet. There was scarcely a perceptible motion of the patient. The wood was left there for an instant, then pulled out, and to my surprise, the pulp came away with it. The stick was remodeled and returned as a permanent stopping for the end of the root. "Seeing is believing." I saw at once that it was the simplest, common-sense surgery; and without discussing it now, I will say that the practice applied to hundreds of cases *proves* it; this to my personal knowledge.

"Put yourself in his place." Yes, I did, last December; I had satisfied myself that I could be relieved of an uncomfortable plate, which I had been obliged to wear for some thirty-two years. I lost, when a boy, my superior central incisors by a fall; the roots were removed when I was about fourteen years old. (My mouth is full of the rise and progress of dentistry, and I am purposing a paper, *illustrated*, giving its history from the dental side.) I had been considering for some time the profit I would gain by losing the lateral crown and pulp, as compared with the discomforts of the plate. After seeing several practical cases of a similar nature in satisfactory use, I decided to have the operation made. I can testify that the pain in having the pulp "knocked out" was not worthy of notice; and I am at this date, June 19, 1883, the happy possessor of a central incisor and lateral, carried on the lateral root, with a little spur resting in the palatal surface of the opposite lateral; the space having contracted since the extraction of the

roots of the two incisors, I had room for only one. I am delighted with the results. The comparative comfort over the plate is beyond expression. Dr. Gaylord, of New Haven, saw the success of my case, and he has a *fac simile*, dispensing with a plate which he had worn twenty-five years. I shall have something further to say in a little time about this style of crown work and bridges with spurs. As the method has been looked upon from the *down side*, I shall endeavor to present the subject from the *up side*.

Now for an answer to the question: Who did it first?

Dr. C. M. Richmond tells me that Dr. George Lawrence, son of Dr. Ambrose Lawrence, of Lowell, Mass., made a practical use of this operation of "pulp-knocking" in the mouth of his brother, Dr. A. S. Richmond, in Chicago, September, 1878, upon a superior central incisor, for a crown setting. This practice had been in use by Dr. A. Lawrence for twenty-five years. Who did it before this, let some one else answer. At the union meeting held in Springfield during this month, this "pulp-knocking" was detailed by Dr. J. L. Williams in connection with his remarks, illustrated, upon how the root of a tooth receives its nourishment after the removal of the pulp, and Dr. Searle stated that he had often resorted to a method of plunging a sharp stick into the pulp, and that the patient said it seemed (as I should think it would) that a broom-handle had been thrust up through his head. My impression at that time was this: that they failed to catch the idea that it could be done comparatively painlessly, and that it could be made a humane operation. I will only add, that report says "pulp-knocking" has been *patented*.—G. A. Mills.

Gold Fillings Cause Mercurial Poisoning! Actual Cases Prove It(?)—Mrs. D., aged 30, has had homeopathic medication since a child. When I first saw her seventeen years ago her gums were tumid and her breath unpleasant. She had a few teeth already filled with gold. I have filled ten or twelve more cavities for her in the course of seventeen years, always with gold and nothing else. The gums and breath were never in any better condition than when I first saw her, and she all the time had the same medical attendant. Three months ago the left upper lateral incisor became sore to the touch, and above it, on the gum, came a purple swelling. There was much pain here for some weeks. At last a bit of necrosed bone came out of an ulcerating opening over the root of this incisor near its root-end. Tha canine is not decayed. The left central incisor has a medium-size gold filling in it. The nerves of all these teeth are alive. Applying the reasoning of *amalgam haters* to this case, the disease was produced by the gold fillings undoubtedly. I have observed many cases of this kind, and it ought to be a terrible warning to the profession. Tons and tons of this vile stuff are inserted in the teeth of a suffering and ignorant public yearly, and legislation ought to put a stop to it, otherwise the whole population will be swept from the face of this continent by gold blood-poisoning.—C.

In inserting artificial teeth it is, of course, desirable to make them appear natural instead of false, and for this purpose a few gold fillings are often a great advantage. The following method of preparing the cavities I have found to be as easy, and cheaper than with the diamond. Use a hard-tempered, spear-pointed steel drill in the engine, and while operating keep wet with a solution of spirits of camphor and spirits of turpentine in equal parts. The cutting will be facilitated by giving the hand-piece a slight rotatory motion. If a contour filling is desired, grind off with the corundum wheel as much as is desired for "contour," after which make the retaining portion with the drill.—M. G. J.

THE

DENTAL COSMOS.

VOL. XXV. PHILADELPHIA, SEPTEMBER, 1883. No. 9.

ORIGINAL COMMUNICATIONS.

THE COLLAR CROWN.

BY WILBUR F. LITCH, M.D., D.D.S., PHILADELPHIA.

IN this paper will be explained and illustrated a method for the mounting of artificial crowns, which the writer has taught and practiced during the past few years, and which he has found to quite perfectly meet the true mechanical requirements of that class of substitutive operations. The method is more particularly applicable to the incisors and canines of the upper jaw.

A fairly typical case would be a well-developed upper incisor-tooth, in normal relation with its fellows, in which, in consequence of the ravages of caries or other misadventure, only a small portion of the crown remains. Such a case is represented in Fig. 1.

The earliest form of what is, absurdly enough, known to the profession as "pivoting" was that in which a natural crown was attached to the root by means of a wooden pin or dowel; subsequently a porcelain crown, of the same size and shape as the natural one, was employed, the wooden pin being still retained.

The use of this form of crown made the removal of every portion of the natural tooth up to the gum margin absolutely necessary, thus sacrificing often a very considerable amount of tooth-substance, and to that extent still further weakening the organ; as, other things being equal, the greater the amount of material in the tooth or in the root, the greater will be its resisting power to the forces to which it may be subjected. Although, as will presently be shown, with the introduction of plate-teeth, metallic backing, and pin for artificial crowns, such extreme sacrifice of tooth-substance was no longer required, in this respect the old method is still very generally followed.

The process to be described reduces this destruction of tissue to the

minimum. Instead of cutting the palatine wall of the tooth down to the gum margin, the greater portion of it is carefully conserved, its presence, while not indispensable to a successful result, being in the highest degree desirable. How much of this portion of the tooth can be retained will depend upon the nature of the occlusion.

In Fig. 1 the dotted line from C to D represents the point to which the tooth is cut away in the older methods of "pivoting;" the dotted line from A to B, the line of abscission practiced by the writer.

As will be seen by reference to Fig. 2, the face of the tooth thus prepared presents a gradual slope from the palatal surface to the labio-cervical margin. At the latter margin the root should be cut down with suitable burs, etc., to a point a little beneath the edge of the gum, in order that the neck of the porcelain tooth in front may pass up under the gum-margin and the joint between root and tooth be concealed. At this point tooth-substance may be sacrificed, as it does not materially diminish the strength of the root.

Fig. 1.

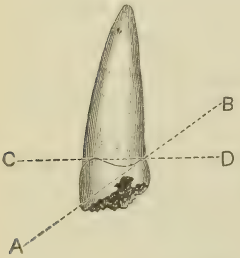
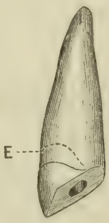


Fig. 2.



The several parts employed in the making of the artificial crown are a plain-plate porcelain tooth, a platinum backing, and a base-plate, collar, and retaining-pin of the same metal. For a solder and covering, either coin-gold or twenty-carat gold, alloyed with copper or silver only, should be employed.

In shaping the pulp-canal for the reception of the retaining-pin care should be taken not to weaken the root by an unnecessary enlargement of the caliber of the canal. The platinum pin need not be more than No. 16, Stubs's gauge, in thickness at its point of greatest diameter, near the free surface of the root, where all the strain, if any, falls; from this point it should be made a gentle taper corresponding to the natural shape of the space it is to occupy. Half an inch in length is ample; even less will serve. The base-plate and collar are made of very thin platinum, about No. 32, Stubs's gauge. The platinum backing may be made thin or thick indifferently.

The platinum pin being shaped and adjusted in the root, care being taken to leave an excess in length at the free end for convenience in subsequent manipulations, the next step in the process is the making of the base-plate and its attachment to the pin. A strip of thin platinum of suitable size is pressed upon the face of the root, with broad-pointed, serrated instruments, until it is in close adaptation to the surface at every point. This base-plate is allowed to *project beyond*

and *overhang* the palatine portion of the root, but should not come quite to the labial edge.

Adaptation being secured, an opening is made in the base-plate where it covers the pulp-canal, through which opening the platinum pin may be pressed up into position in the root. Pin and base-plate are then removed from the mouth, dried, and cemented with a brittle resinous cement, and then, while the cement is still plastic and yielding from heat, placed again in position in and upon the tooth and perfect adaptation secured. Then, while still in position in the mouth, throw upon the cement a stream of very cold water, so that it may be made brittle and incapable of bending. Then remove from the mouth and invest in a mixture of equal parts of plaster and pulverized marble or pumice-stone, with enough water to make a thick paste. After the investment has set, solder the platinum pin and the base-plate together.

To make the collar, a somewhat crescent-shaped piece of thin platinum of suitable size is prepared and pressed into shape upon the palatine and palato-approximal face of the tooth; little slits may be cut in the collar with a delicate pair of scissors, to make easier this adaptation. Care should be taken not to push the collar up under the gum at any point, provided the palatine wall of the tooth which had been allowed to remain standing is at all ample in height, say one-tenth of an inch; if less than this, the collar may pass under the gum for a short distance, as will be shown subsequently. In the average case this collar will not quite one-half encircle the tooth.

FIG. 3.

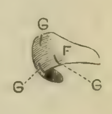


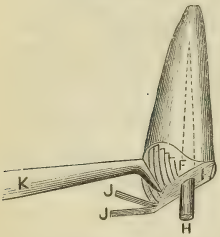
Fig. 3 shows the collar curved to the outline of the gum margin, and shaped to the contour of the palato-approximal wall of the tooth. At G are the slits cut in the platinum to allow overlapping in shaping to contour.

In order to strengthen the collar and facilitate its attachment to the base-plate, cut a series of slits in that portion of the base-plate which has been made to project beyond the palatine wall of the tooth, and the base-plate, with its now attached pin, being placed with the collar in position in and upon the tooth, the little strips of platinum into which the overhanging edge of the base-plate has been cut are pressed, one after the other, down upon the collar and carefully molded to its surface, so that the collar will no longer consist of a single thickness of very thin platinum, but will be reinforced by these additional thicknesses of base-plate thus pressed upon it.

Fig. 4 shows this quite perfectly: H is the free end of the retaining-pin which is to be cut off when the porcelain tooth is mounted. I is the base-plate, with its overhanging palatine margin cut into strips, J, which are being pressed down upon the collar, F, by the

broad surfaced and serrated instrument K. This being accomplished, remove the several pieces from the mouth, carefully cement the collar in its proper position relative to the base-plate, which will now form a sort of matrix for it, again place in the mouth, readjust, harden the cement, remove from the mouth, invest as before, and solder the collar and base-plate together, using a considerable excess of solder for covering, so that the collar may be still further strengthened and its surface be made uniform.

Fig. 4.



In cementing the collar to the base-plate one precaution is imperative, namely, not to allow a film of cement to get between the collar and the tooth. If this is done and the investment poured in upon this film of cement, the latter will immediately burn out as soon as heat is applied, leaving a space between the collar and the investment into which the gold solder will flow, and thus interfere with that perfect adaptation of the appliance to the tooth which is necessary to a successful result.

The mounting of the tooth next demands attention. As already stated, a plain-plate porcelain tooth is used. This must have what are technically known as cross-pins, that is, pins placed at right angles with the long axis of the tooth. They must also be placed well up towards the cutting-edge. If they are too near the neck they will inevitably be cut out in fitting the tooth to the sharp slope of the base-plate on which it must be mounted.

Fig. 5.

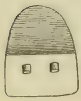


Fig. 5 shows the form of tooth and indicates the slope given it in fitting. The fitting process does not differ from that ordinarily employed with porcelain teeth; an impression may be taken and the work done on a cast, or the tooth may be fitted to the mouth. In either case it is in the mouth that the finer and final adjustments as to height, contour, alignment, etc., must be perfected.

This being done, and the tooth backed, tooth and base-plate are cemented together, restored to the mouth, finally adjusted, removed, and soldered as before; as much gold being flowed into the acute angle between the backing and the base-plate as occlusion will permit.

This artificial crown being properly finished and cemented into position in and upon the tooth makes what the writer, from several years' experience in its use, in a large number of cases, has found to be an appliance which will remain for an indefinite period without the slightest deviation from position and alignment, and which in many respects is almost as strong as the natural tooth, because its

point of greatest resistance to pressure is placed where nature anchors her enamel walls, namely, upon the *outside* and not upon the inside of the walls of dentine; so that in the act of occlusion the force applied by the lower incisors as they come up in position *inside* the upper incisors, falls upon the *whole* thickness of the root *through the collar*, and not upon less than half its thickness through a centrally anchored pin,—a pin, too, prolonged into a lever of enormous power by its attachment to the porcelain tooth.

In this respect there is a manifest weakness in all methods of mounting artificial crowns which depend for their stability solely upon the central pin. Ultimate failure, through splitting of the root, is the frequent result, and the larger and stronger and more deeply anchored the pin, the more certain this result, because a large pin necessitates a large opening for its reception, and a corresponding weakening of the root, upon which the strain must ultimately fall; the lever is strengthened and the point of resistance weakened.

The only safety for the usual form of "pivot-tooth" is, either that the occlusion shall be slight, the root very strong, or the "pivot" very flexible or elastic. This elasticity of the old hickory "pivot" was one of its chief excellences; roots were much less likely to split than with a rigid, unyielding, metallic pin. In canines or incisors, however, metallic pins, unless enormously large, or thickly packed around with amalgam, will very often bend outward, thus allowing a slight displacement forward of the artificial crown, and to that extent relieving the root from strain.

Fig. 6.

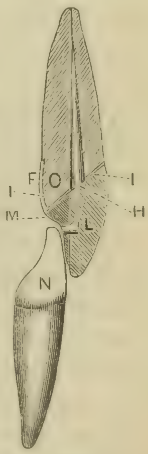


Fig. 6 shows the artificial crown. L is the porcelain tooth, mounted and in occlusion. H is the pin attached to I, the base-plate. M is the backing and solder. N is the lower incisor, and F, the collar. It is clearly evident that here the force of occlusion falls upon the palatine wall of the natural tooth at O through the collar F, and not upon the pin at the point of its attachment to the base-plate H, and through the pin upon the thin outer shell of the root.

In cases frequently met with, where the entire crown of the tooth has been removed, the collar, as before described, can be adapted to the palatine face of the root, provided the latter be not decayed away up to the alveolar margin. Usually, however, there is a considerable space between the free edge of the root and the alveolus, and here, running up to the alveolus, the collar must be placed.

The dotted line E, in Fig. 2, indicates a collar so placed. All the steps in the process are essentially the same as before described.

Adapting the collar to the surface of the root beneath the gum is somewhat painful, but not excessively so, and in the wearing, the irritation caused by its presence is very slight and transient in character, assuming, of course, that care has been taken to leave upon it a smooth, thin, and well-polished edge.

The objection may be urged that this form of crown resists pressure only in one direction, from within outward, and does not provide for lateral pressure or pressure from the front. As a rule, the latter can occur, with any force, only as the result of accident, while if the crowned tooth is in normal relation with its fellows, and the artificial crown be closely fitted in between them, they will fully sustain lateral force.

Where such lateral support is wanting, through isolation of the tooth, the collar must be extended into a ring or ferrule completely encircling and grasping the root, and thus affording support on all sides. The ring, however, is more troublesome to make and more painful to apply, and generally shows a line of gold in front. In the average case the simple collar gives all requisite strength.

In mounting crowns upon bicuspid and molar roots, however, the ferrule principle is often essential to stability; especially is this true of lower bicuspids and molars; as here the forces applied in mastication are as erratic in direction as they are powerful in character, and the root must be guarded at every point against their violence.

In fixing in position the artificial crowns just described, the writer prefers to use a gutta-percha cement very adhesive in character. A preparation sold under the name of "Prepared Gutta-Percha" by The S. S. White Dental Manufacturing Co., possesses this property in a high degree, and does not strip from the pin when the crown is forced into position, as would a less adhesive quality.

The apical foramen is closed, the pulp-canal grooved and thoroughly dried, the central pin is barbed, and the pin and inside of the collar and under surface of the base-plate are thickly coated with the gutta-percha; then heat the entire appliance to a temperature sufficient to thoroughly soften the gutta-percha, and firmly press it up into position; the excess of gutta-percha will ooze out at all free margins and may be subsequently removed with suitable instruments.

This cement will hold firmly in a great majority of cases, but when, as in a small lateral incisor, the retaining-pin is necessarily small and short, and the collar not as ample as could be desired, an oxychloride or oxyphosphate cement, mixed thin, will be found to give greater stability. When these cements are used, however, it will be found very difficult to detach the artificial crown from the root, should it for any reason become necessary to do so; whereas, a little heat will quickly soften a gutta-percha packing and permit the entire appliance to be withdrawn without difficulty.

PROCEEDINGS OF DENTAL SOCIETIES.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

PURSUANT to a call by the secretary of the conference of State Boards of Dental Examiners, held at Lexington, Ky., in February last, a meeting of members of State boards was held at Niagara Falls, commencing Monday, August 6, 1883.

The following State boards were represented: Iowa, by W. P. Dickinson; Vermont, by James Lewis and G. H. Swift; Indiana, by P. G. C. Hunt, M. H. Chappell, and Seneca B. Brown; New Jersey, by J. Hayhurst; Pennsylvania, by C. N. Peirce; Ohio, by H. A. Smith, C. R. Butler, I. Williams, J. Taft, and F. H. Rehwinkel; Michigan, by G. R. Thomas and J. A. Robinson; Illinois, by George H. Cushing and A. W. Harlan; Georgia, by J. H. Coyle and G. W. McElhaney.

The meeting was called to order by Dr. Taft, chairman of the conference, who made a brief statement of the objects and work of the conference.

On motion of Dr. H. A. Smith, the meeting proceeded to organize temporarily. Dr. J. Taft was elected president, and Dr. George H. Cushing secretary of the temporary organization.

After discussing various methods, it was agreed, on motion of Dr. Peirce, to allow each State board participating ten votes in the work of organization.

On motion, Drs. Cushing, Peirce, and Smith were appointed a committee on permanent organization, to prepare a draft of a constitution and by-laws to be submitted to the meeting, and the meeting took a recess of fifteen minutes, to allow the committee time to perfect their work.

After the recess the committee reported, submitting the draft of a constitution which they had prepared. The report was received, the constitution read by sections, amended, and adopted, as follows:

ARTICLE I.

NAME.

This organization shall be known by the name of the National Association of Dental Examiners.

ARTICLE II.

OBJECTS.

The objects of this association shall be to secure through the operation of the various State examining boards a high and uniform standard of qualification for dental practitioners, and so far as practicable uniformity of methods in the working of these boards, and of legislation in creating them.

ARTICLE III.

MEMBERS.

This association shall consist of such different State boards of dental examiners as may elect to join this national association. They may be represented either by delegate or delegates, duly authorized, or by the whole board. Certificates from the proper officers of any board will be necessary to entitle such board to representation in this body.

ARTICLE IV.

VOTES.

Each State board shall be entitled to ten votes, and in case the whole number of members of any board are not present at any meeting of the association, the whole number of votes of that board shall be equally distributed among and cast by those members of said board who are present.

ARTICLE V.

DUES.

Each State board becoming connected with this association shall pay annually to the treasurer the sum of five dollars.

ARTICLE VI.

OFFICERS.

The officers of this association shall be a president, a vice-president, a secretary and treasurer, the last-named two offices combined in one. They shall be elected by ballot, without nomination, and shall hold their appointment for one year or until their successors are elected and qualified. A majority of all the votes cast shall be necessary to a choice.

ARTICLE VII.

DUTIES OF OFFICERS.

The president shall preside at all meetings according to parliamentary usage as laid down in Cushing's Manual.

The vice-president shall perform the duties of the president in case of the latter's absence or inability.

The secretary and treasurer shall keep correct minutes of the proceedings, give due notice of meetings, attend to the needed correspondence, and receive and hold all moneys belonging to the association, and from them shall pay all drafts of the president countersigned by the secretary. His accounts shall be audited by a committee of three appointed annually for that purpose.

ARTICLE VIII.

OBLIGATIONS OF STATE BOARDS.

All State boards belonging to this association shall be bound by its action so long as they continue members of it. Any board refusing to be bound by the action of this body shall from that time cease to be a member thereof.

ARTICLE IX.

QUORUM.

The representatives of five State boards shall constitute a quorum for the transaction of business.

ARTICLE X.

TIME OF MEETINGS.

There shall be held annually a meeting of this association at such time and place as the association may determine. The president may call a meeting at any time during the year upon the written request of five State boards.

ARTICLE XI.

AMENDMENTS AND ALTERATIONS.

Amendments to this constitution may be made at any annual meeting by the consent of all the members present. In case of any opposition, notification in writing shall be made of any such proposed change, and shall be laid over for one year for final action, when the amendment can only be adopted by an affirmative vote of three-fourths.

The association then proceeded to the election of officers to serve for the ensuing year, which resulted as follows: J. Taft, president; G. W. McElhaney, vice-president; Geo. H. Cushing, secretary and treasurer.

Adjourned to 8 o'clock P.M.

Evening Session.

The session was devoted to the consideration of a standard of qualifications to be recommended to the various State boards in the examination of applicants for certificates to practice.

Dr. Cushing submitted the list of questions prepared by the committee appointed at the conference in February last, and moved that the standard be raised twenty-five per cent. over that indicated by the questions. He explained that, as a matter of course, this series of questions, when prepared, was not intended to be followed literally by the State boards. Each board was expected to frame its own questions. The purpose of the conference was to supply a basis indicating the minimum standard of qualifications which should be accepted by the boards, and upon which a somewhat uniform course in examination could be founded.

Following is the list of questions referred to by Dr. Cushing:

ANATOMY.

1. Name five of the principal tissues of the body.
2. Of what does the skeleton consist?
3. What is the immediate covering of the bones?
4. Name, locate, and describe the muscles of mastication.
5. Name the bones of the face.
6. Locate and describe the maxillary sinus.
7. Name, locate, and describe the salivary glands.
8. Give the origin and course of the nerves which supply the teeth.
9. Name the different parts of the vascular system.
10. Name two of the largest glands of the body.
11. Name the muscles which depress the lower jaw.
12. Name the facial muscles, giving their origin and insertion.

PHYSIOLOGY.

1. Describe the process of digestion.
2. Name and describe the digestive secretions.
3. What is the function of the liver? of the kidneys? and of the skin?
4. Describe the circulation of the blood and the physiological action produced by it.
5. Describe some of the changes produced in the air taken into the lungs by the process of respiration.
6. Give some of the sources of the carbonic acid exhaled from the lungs.
7. Name some of the chief functions of the nervous system.
8. What is reflex nervous action? Give example.
9. What cranial nerve being a motor nerve at its origin joins a nerve of sensation and becomes a nerve of special sense?
10. What reciprocal influences do the sensory and sympathetic nerves have upon each other?

HISTOLOGY.

1. From what class of tissues do tooth-germs originate?
2. Give the minute anatomy of the three hard structures of the tooth and the order of their development.
3. Name and describe the structure of muscular fiber.
4. Describe the corpuscular elements of the blood.
5. Name and describe the layers of the mucous membrane.
6. Describe the nerve-tissues.
7. Describe the formation and structure of bone.

PATHOLOGY.

1. What is disease?
2. Define the various stages of inflammation.
3. Explain the difference between caries and necrosis of bone.
4. Describe exostosis. What causes it?
5. What is the difference between fever and inflammation?
6. In what ways may inflammation terminate?
7. Describe the source and formation of pus.
8. Give the distinctive features of neuralgia.
9. What conditions of tooth-pulp occasion pain?
10. Name the agents concerned in, and describe the process of dental caries.
11. Name and describe the common diseases of the gums.

MATERIA MEDICA.

1. From what sources are medicinal agents obtained?
2. Name six of the remedial agents derived from the vegetable kingdom.
3. Name six obtained from the mineral kingdom.
4. From what other sources are remedial agents or influences derived?
5. From what sources are the principal sedatives derived?
6. Name five valuable stimulants.
7. Name three efficient arterial sedatives.
8. Name and describe the action of two principal escharotics?
9. Name five important tonics.
10. Name in order of potency five of the leading poisons.

SURGERY.

1. What conditions demand surgical interference?
2. For what purpose or purposes are surgical operations performed?
3. What are some of the dangers to be feared from surgical operations?
4. What are the means employed for arresting excessive hemorrhage?
5. Describe your method of opening the maxillary sinus for treatment.
6. What operations are resorted to in treatment of neuralgia?
7. Describe your treatment for fracture of the inferior maxilla, between the cuspid and bicuspid tooth.
8. How would you proceed to reduce a partial or complete dislocation of the lower jaw.
9. Describe the operation for ranula.
10. What conditions of the maxillary sinus require surgical interference?

THERAPEUTICS.

1. What is therapeusis?
2. To what does prophylaxis refer?
3. What do you understand by abortive measures?
4. What is the object of palliative treatment?
5. What are the principles involved in the treatment of inflammation?
6. What is the best treatment for alveolar abscess?
7. In what cases may diseased tooth-pulp be restored and preserved, and by what treatment?
8. Give treatment for simple inflammation of the gums.
9. Give the treatment for aphthous sore mouth, and pyorrhea alveolaris.
10. Give a list of therapeutic agents valuable to the dentist in general practice.

CHEMISTRY.

1. What is an element?
2. How many elements are there?
3. What is a compound substance?
4. In what condition are elements found in nature?
5. What properties are possessed in common by nearly all the elements?
6. What element is found most abundant in nature?
7. For what element is there the most extensive affinity?
8. What classes of substances are the best conductors of heat and cold?
9. What are the chemical constituents of dentine and enamel, and what are the proportions of each?
10. What are the chemical constituents of saliva?

OPERATIVE DENTISTRY.

1. What is dental periostitis? in what respect is it peculiar? and what is the treatment?
2. Name and describe the various affections of tooth-pulp and the treatment proper for each.
3. Give the peculiarities of hyper-sensitiveness of dentine, with principles and modes of treatment.
4. Describe the common points to be observed in the preparation of a cavity for filling.
5. Name and describe the various steps in the introduction of a gold filling.
6. Mention some of the common causes of failures in filling teeth.

7. How does filling arrest the decay of the teeth?
8. What qualities are requisite in materials used for filling teeth?
9. Give the origin, manner of deposit, and effects of salivary calculus.

PROSTHETIC DENTISTRY.

1. What anatomical and physiological changes are occasioned by the loss of the teeth?
2. What restoration is prosthetic dentistry able to give the toothless?
3. Name, in the order of their importance, five points that should be attained in the insertion of artificial teeth.
4. What are the requisite properties of materials for constructing artificial dentures? Name the different materials in use, in the order of their value.
5. In what condition should the mouth be for the proper reception of a denture?
6. Describe a method or methods of making an accurate model for constructing a set of teeth.
7. What will guide in the arrangement of artificial teeth?
8. Describe the various modes of retaining artificial teeth in the mouth.
9. What are the advantages and disadvantages of gold, of continuous gum, of rubber, and of celluloid as a base?

IRREGULARITIES.

1. What are the most common causes of irregularity of the teeth?
2. Give instances of irregularities of a congenital nature, with approved modes of treatment.
3. Name some accidental irregularities, and manner of treating them.
4. What diseases are most frequent causes of lesions of the jaws and palate?
5. Under what circumstances will neglect or unwise treatment of the temporary teeth lead to imperfect development of the permanent ones?
6. Are the maxillary arches capable of expansion? if so, by what means?
7. What would be the best means of regulating a crowded arch with the cuspids standing inside the line?

A long discussion followed, participated in by most of the delegates present, in which the workings of the laws regulating practice in the various States were brought out. The general experience was that somewhat less than half the candidates—say about one-third—were granted certificates.

Dr. McElhaney stated that the Georgia board fixed a very high standard; that the man who could pass their examination would, as a rule, have sufficient knowledge to get a college diploma; that the work of the board is divided up among the members by the chairman, they having a written examination, and he claimed that they thus have a wedge on the candidate if brought into court. Each examiner has ten votes, and the candidate must receive thirty-five, to pass. The number of candidates has been getting less and less each year, until at the last session not a single candidate appeared. The legislature had made the violation of the law regulating the practice of dentistry in that State a penal offence, and in consequence the board has had little to do of late.

Dr. Hayhurst said that at the last session the New Jersey board examined six applicants, of whom two were granted certificates, two were held under advisement, and two were rejected.

Dr. Peirce said that since the passage of the Pennsylvania law in 1875, the board have examined forty-five applicants, of whom fifteen have received the certificate.

Dr. Cushing's motion to request State boards to increase their standard of examination twenty-five per cent. above that shown in the list of questions printed was adopted.

On motion of Dr. Peirce a committee of three, consisting of Drs. Peirce, McElhaney, and Lewis, was appointed to prepare a schedule of work for to-morrow morning.

Adjourned to 8 o'clock A.M. the following morning.

SECOND DAY.—*Morning Session.*

The committee appointed to prepare a schedule of work for the day reported a series of resolutions which were finally adopted, as follows:

1. *Resolved*, That a committee of two, consisting of the president and vice-president, be appointed to act with the secretary in carrying out the requests of this association.
2. *Resolved*, That this association enjoin its members to accept the diploma from no college which does not require two full regular courses of lectures, or its equivalent—one full course and five years' practice—previous to granting such degree.
3. *Resolved*, That this association insists that no board now connected with this body shall confer degrees or titles of any nature.
4. *Resolved*, That this association urge upon the State societies of all States where no law exists the necessity of an immediate effort for such legislation.
5. *Resolved*, That this association furnish all the State societies with a copy or copies of a well-digested law, so that uniformity in legislation as far as practicable may be attained.

The third resolution was the only one which excited discussion. Dr. Hayhurst said that under the peculiar circumstances by which he was surrounded he ought not to let it pass without remark. The New Jersey board has been very desirous to have the power to confer the degree of Master of Dental Surgery. A committee was appointed last year to represent the matter to the legislature, and it was finally argued before a committee of the legislature, but without securing the legislation asked. At a late meeting of the board the report of the committee came up for action, and the committee was continued. The same effort will be again made.

Dr. Lewis said, there was a time when the power to grant degrees might have been conferred on an examining board, possibly with benefit, but he thought that day was past. The object in passing

laws and getting a board of censors appointed was to drive the young men intending to enter dentistry into the colleges. He despised a catch-penny diploma. We have reputable colleges to which we can send our sons and friends where they can become properly qualified. To go before an examining board having the power to confer degrees was a cheap way to get a diploma. He believed in a thorough examination and a thorough course in college before any degree was granted.

Dr. Peirce said that this resolution was brought before the association for the express purpose of strengthening the hands of those who are opposing any legislation which will enable State boards to grant degrees.

Dr. Rehwinkel. We have already adopted the resolution refusing to recognize the diplomas of dental colleges which grant degrees upon examination. To be consistent we must adopt this. Why should we refuse the colleges this right and give it to the State boards? Laws for the regulation of dentistry are not intended to give the right to grant a degree. It is only intended to give the right to ascertain the qualifications of candidates to practice dentistry. The adoption of this resolution may prevent the State board of one of the largest States from joining in this movement, but that should not stand in our way. In New York the degree M.D.S. (Master of Dental Surgery) is granted by the State board of censors.

Dr. Chappell. There are some questions to be developed with regard to the rights of State boards in these matters. He understood that the question was now pending before one of the State supreme courts. If we adopt this resolution we shall shut out New York, Louisiana, Iowa, and Ohio, and perhaps others.

Dr. Lewis. We cannot afford to let down the bars in this matter. If the medical student could go before a State board for examination where would the medical profession be? The man who goes into the practice of medicine without a diploma is called a quack. Yet we pretend to be regular doctors of dental surgery. Let us be consistent. The speaker did not approve of the granting of any degree by a State board. The result of the action of the medical profession in requiring a regular education has been to drive all the young men seeking to begin the practice of medicine into the medical colleges. Let us have every help we can in crowding the young men into the colleges, there to receive the proper education for the practice of dentistry.

Dr. Harlan read an extract from the paper of Dr. A. H. Thompson, in the Dental Cosmos for August, to show the influence which the examining boards will have on the future of dental education if their power is wisely directed.

Dr. Thomas. It is hardly to be expected that a matter so far-reaching as the resolution under discussion will be adopted, without a dissenting voice. It seems to be feared that some of the State boards will not acquiesce in its demands. If so, that will be their misfortune, not ours. It would be well, however, if possible, that unanimity should prevail in all our recommendations. In this interest, he would offer a resolution as a substitute for the one under consideration, that the committee on programme report to this body a form of certificate to be issued to those found qualified to practice dentistry upon examination by the various boards.

Dr. Cushing. There seems to be a misconception on the part of some of the gentlemen present as to what a title is. New York permits its board to confer a distinct title, M.D.S. This is not the equivalent of the certificate of qualifications conferred by other boards. These certificates are in no sense titles and are not so intended by the laws which confer the right to inquire into the fitness of applicants to practice dentistry. This resolution is to point out the course which it seems proper the State boards should pursue. Dr. Thomas's resolution is all right in its place, but not as a substitute for the resolution under discussion.

Dr. Smith would have a uniform method or form of certificate adopted by the boards. The size also should be such that it could not be mistaken for a diploma.

Dr. Rehwinkel thought it was important to understand precisely the object of the resolution. There seems to be some difference of opinion as to the scope of a certificate, and what it comprehends. Illinois does permit the issue of a license; the speaker doubted if Ohio does. All the Ohio law contemplates is that the examiners shall ascertain the candidate's qualifications. New York gives its State board the right to confer a title, which is used by those who receive it the same as M.D. or D.D.S., and it is held out as an inducement over other State boards. Some colleges claim that they have the same right as the State boards to examine applicants and give them the degree, when found competent, without attendance upon lectures. Of course they have the right to confer the honorary degree, and if honestly done, it is proper. Where a man has achieved reputation it is right and proper to give recognition to his merit. But the idea that any college can take a young man and examine him without requiring attendance on its lectures, and confer the degree, is not to be entertained. It is certainly incumbent on this association to state its opinion on this subject; while it may not presume to dictate, it is right that it should speak in no uncertain tone.

Dr. Williams, while in sympathy with the spirit of the resolution, could not vote for it without some modification. If the resolution,

instead of "insist," should read "recommend," or some other similar word, he would vote for it.

Dr. Hayhurst, without expressing his own private opinion on the subject, could not, as the representative of a divided board, vote directly opposite to what he knew to be the spirit of that board.

Dr. McElhaney. We, in Georgia, do not recognize the New York degree as of any more value than our certificate. If an M.D.S. came to Georgia to practice, we should put him through an examination. If he had the degree D.D.S. he would not have to pass an examination. Perhaps it would be better to "recommend" rather than to "insist."

Dr. Thomas. We are legislating, so to speak, to prevent the acceptance by the uninformed public of a certificate granted by a State board as of equal value with the diploma of a dental college.

Dr. Coyle thought it would be impolitic to recommend to the State boards that they shall become schools of dentistry, and that is what they would practically become if permitted to confer a degree.

The resolution was then amended by the insertion of the word 'now" after board, and was adopted as printed above.

Dr. Thomas's resolution with regard to the form and size of certificate was referred to the committee on programme of the association.

Dr. Harlan moved the appointment of a committee of five to prepare a draft of a law which should embody the features which seemed most desirable from the experience of the workings of the various laws now in force, to serve as a basis for those States which have not yet enacted laws upon the subject, and thus tend to the attainment of harmonious action. Adopted. Drs. Harlan, Taft, Peirce, Coyle, and Lewis were appointed.

Adjourned to 4.30 P.M.

Afternoon Session.

The names and addresses of the members of the various boards represented were called for and given to the secretary.

Dr. Harlan, from the committee on form of law, reported that the committee had decided to make only one change in the draft prepared at Lexington before submitting it to the association. The report was received and the law was considered. Several additional amendments were made and the form as at last adopted was as follows:

An Act to insure the better education of practitioners of Dental Surgery, and to regulate the practice of dentistry in the State of———

SEC. 1. Be it enacted by the people of the State of ———, represented in the General Assembly, that it shall be unlawful for any person who is not at the time

of the passage of this Act engaged in the practice of dentistry in this State, to commence such practice unless he or she shall have obtained a certificate as hereinafter provided.

SEC. 2. A board of examiners, to consist of five practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this Act.

The members of said board shall be appointed by the Governor, who shall select them from ten candidates whose names shall be furnished him by the ——— State Dental Society.

Three members, at least, of this board shall be members of the ——— State Dental Society.

The term for which the members of said board shall hold their offices shall be five years, *except* that the members of the board first to be appointed under this act shall hold their offices for the term of one, two, three, four, and five years respectively, and until their successors shall be duly appointed.

In case of a vacancy occurring in said board, such vacancy shall be filled by the Governor from two names furnished him.

SEC. 3. Said board shall choose one of its members president, and one the secretary thereof, and it shall meet at least once in each year, and as much oftener and at such times and places as it may deem necessary. A majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

SEC. 4. Within six months from the time that this Act takes effect, it shall be the duty of every person who is now engaged in the practice of dentistry in this State, to cause his or her name and residence, or place of business, to be registered with said board of examiners, who shall keep a book for that purpose. The statement of every such person shall be verified under oath, before a notary public or justice of the peace, in such manner as may be prescribed by the board of examiners.

Every person who shall so register with said board as a practitioner of dentistry may continue to practice the same as such, without incurring any of the liabilities or penalties provided in this Act, and shall pay to the board of examiners for such registration a fee of one dollar.

It shall be the duty of the board of examiners to forward to the county clerk of each county in the State a certified list of the names of all persons residing in his county who have registered in accordance with the provisions of this Act, and it shall be the duty of all county clerks to register such names in a book to be kept for that purpose.

SEC. 5. Any and all persons who shall so desire may appear before said board at any of its regular meetings and be examined with reference to their knowledge and skill in dental surgery, and if the examination of any such person or persons shall prove satisfactory to said board, the board of examiners shall issue to such persons as they shall find to possess the requisite qualifications a certificate to that effect in accordance with the provisions of this Act. Said board shall also indorse as satisfactory diplomas from any reputable dental college when satisfied of the character of such institution, upon the holder furnishing evidence satisfactory to the board, of his or her right to the same. All certificates issued by said board shall be signed by its officers; and such certificate shall be "prima facie" evidence of the right of the holder to practice dentistry in the State of ———.

SEC. 6. Any person who shall violate any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction may be fined not less

than fifty dollars, nor more than two hundred dollars, or confined six months in the county jail, for each and every offense. All fines recovered under this Act shall be paid into the common school fund of the county in which such conviction takes place.

SEC. 7. In order to provide the means for carrying out and maintaining the provisions of this act, the said board of examiners may charge each person applying to or appearing before them for examination for a certificate of qualifications, a fee of ten dollars, which fee shall in no case be returned, and out of the funds coming into the possession of the board from the fees so charged, the members of said board may receive as compensation the sum of five dollars for each day actually engaged in the duties of their office, and all legitimate and necessary expenses incurred in attending the meetings of said board. Said expenses shall be paid from the fees and penalties received by the board under the provisions of this Act. And no part of the salary or other expenses of the board shall ever be paid out of the State treasury. All moneys received in excess of said per diem allowance and other expenses above provided for, shall be held by the secretary of said board as a special fund for meeting the expenses of said board and carrying out the provisions of this Act, he giving such bond as the board shall from time to time direct. And said board shall make an annual report of its proceedings to the Governor, by the fifteenth of December of each year, together with an account of all moneys received and disbursed by them pursuant to this Act.

SEC. 8. Any person who shall receive a certificate from said board to practice dentistry shall cause his or her certificate to be registered with the county clerk of any county or counties in which such person may desire to engage in the practice of dentistry, and the county clerks of the several counties in this State shall charge for registering such certificate a fee of twenty-five cents for each registration.

Any failure, neglect, or refusal on the part of any person holding such certificate to register the same with the county clerk as above directed, for a period of six months, shall work a forfeiture of the certificate, and no certificate, when once forfeited, shall be restored, except upon the payment to the said Board of Examiners of the sum of twenty-five dollars as a penalty for such neglect, failure, or refusal.

SEC. 9. Any person who shall knowingly and falsely claim or pretend to have or hold a certificate of license, diploma, or degree granted by any society, organized under and pursuant to the provisions of this act, or who shall falsely and with intent to deceive the public, claim or pretend to be a graduate from any incorporated dental college, not being such graduate, shall be deemed guilty of a misdemeanor, and shall be liable to the same penalty as provided in Section 6.

Dr. Peirce, from the committee on programme, reported Dr. Thomas's resolution, amended, that this association recommend to the several State boards the propriety of a certificate of qualifications of such style and size as to be readily distinguished from the ordinary college diploma. The resolution as amended was adopted, and the committee of officers was authorized to prepare a form of certificate, with suggestions as to size and style of printing to be recommended to the State boards.

Dr. Chappell moved a resolution of notification to the State boards that the resolutions adopted by the association were to be considered as bearing only on their future action. Carried.

On motion of Dr. Peirce the time and place for the next meeting was left to be determined to the officers of the association, of which due notice should be given.

Dr. Peirce moved that a cordial and earnest invitation be extended to all State boards of dental examiners to join this association and coöperate with it in its work. Carried.

On motion of Dr. Chappell the secretary was authorized to have the proceedings published and copies of them sent to all the State boards.

Adjourned.

AMERICAN DENTAL ASSOCIATION—TWENTY-THIRD ANNUAL SESSION.

The twenty-third annual session of the American Dental Association was held in the parlors of the International Hotel, Niagara Falls, commencing Tuesday, August 7, 1883. Dr. Goddard, the president of the association, having died since the previous meeting, the chair was occupied by the first vice-president, Dr. Geo. J. Friedrichs, of New Orleans.

First Day.—*Morning Session.*

The delegates were called to order at 11 o'clock by Acting President Friedrichs. The session was devoted entirely to routine business.

The acting president read his annual address, in which, after paying a warm tribute to the worth of the members who had died since the last meeting, he eulogized the association in strong terms, claiming that to its labors, during the past twenty-three years, was mainly due the present position of dentistry. "Our special mission," he said, "is the alleviation of human suffering. * * * We are laborers in the field of human progress, and it is only through organized association that dental thought can be thoroughly disseminated and usefully applied. * * * Much has been accomplished, yet we are only at the threshold of our science. Let our watchword be onward and upward."

The amendment to the constitution, laid over from last year, directing that all resolutions appropriating money, except for the legitimate expenses of the association, shall require a two-thirds vote, was adopted.

The proposed amendment changing the manner of nominating officers was indefinitely postponed.

Dr. J. N. Crouse, chairman of the executive committee, reported, recommending that two sessions be held each day—a morning session

from 9 A.M. to 2 P.M., and an evening session from 8 P.M. to adjournment—except the first day. For this day they recommended that no evening session be held, in order to give more time to the Sections to complete their work. The report was adopted.

Dr. C. N. Peirce moved the appointment of a committee of three to take action with respect to the death of Dr. Marshall H. Webb. Drs. Peirce, Darby, and Perry were appointed.

Dr. F. M. Odell moved a similar committee with reference to the death of Dr. William H. Allen. Drs. Odell, Atkinson, and Stockton were appointed.

Dr. F. H. Rehwinkel moved a similar committee with reference to the death of Dr. William H. Goddard, late president of the association. Drs. Taft, Rehwinkel, and McElhaney were appointed.

Adjourned.

Second Day.—*Morning Session.*

The committee appointed to prepare a suitable expression of the sentiment of the association with regard to the death of Dr. Webb reported. The report was received and adopted, and a memorial page in the Transactions was set apart for it, and a copy of the report was ordered to be sent to the family of Dr. Webb.

Dr. Taft eulogized the character and services of Dr. Webb in the cause of dentistry in warm terms.

Section V., Anatomy, Histology, and Microscopy, was called, and Dr. Cushing, its chairman, reported one paper, by Dr. C. F. W. Bödecker, "On the Action of Arsenious Acid upon Dentinal and Pulp Tissue." On account of the absence of Dr. Bödecker, the Section was passed temporarily.

Section VI., Pathology, Therapeutics, and Materia Medica, was called, and reported two papers, by Drs. A. G. Friedrichs and A. W. Harlan respectively.

Dr. A. G. Friedrichs, New Orleans, La., read his paper, which was entitled "Syphilitic Teeth," as follows:

This subject is one in which I have always taken an exceeding interest. From the time I began the study of my profession I have taken advantage of every opportunity to satisfy myself as to whether there were certain deformities that were characteristic and diagnostic of syphilis, recognizing, as I do, their importance and value in diagnosing the more obscure forms of this dreadful disease. I have read Mr. Hutchinson's address, but I must confess that the descriptions which he has given of what are the special deformities are rather vague and of too general a character, and they can be applied to a great variety of deformities associated with interstitial keratitis.

This question occasioned much discussion at the last meeting of

the International Medical Congress. Dr. Magitot read an article at that meeting wherein he stated that the deformities ascribed by Hutchinson to syphilis could not be attributed solely to that cause. Mr. Nacati has also said as much, and in a very interesting work has shown that these deformities could rather be attributed to rachitis than to syphilis. In my own practice I have come across deformities in the teeth of children, resembling the deformities described by Dr. Hutchinson, where there was no trace of syphilis. I have now three cases under observation where there is no history of syphilis; the teeth are of the same character as we find associated with interstitial keratitis. One of the cases has a general inflammation of the eye with loss of mobility; teeth characteristic of, but no syphilis. Many more cases came under my observation while a student at the Charity Hospital, New Orleans, which afforded me very excellent opportunities for investigation; some with syphilitic history, some without; and in both instances, presenting quite a variety of deformities.

The diagnosis of syphilis, as you all know, requires at times the utmost skill, as its symptoms may counterfeit and combine the symptoms of various diseases; so that frequently we are only allowed the bare suspicion. Besides, the patient, when conscious, will often place every obstacle in the way to mislead us, willing to acknowledge any fault of all the ills to which flesh is heir in preference to syphilis; and in many instances, too, patients, themselves inheriting the disease, are unconscious of their infection.

By the foregoing remarks I do not wish to convey the impression that syphilis does not occasion deformities; but to assert that these deformities are unmistakable or invariable evidences of congenital syphilis is, in my humble opinion, too absolute. The experience of others, as well as my own, warrants the statement that as inherited syphilis is a disease affecting the nutritive processes, thereby interfering with the development, not of the teeth alone, but of the whole organism, it could of itself be a cause; but independent of it any other condition that would likewise arrest development, rachitis, etc., for instance, would produce very similar results.

In his address, Mr. Hutchinson asserts that the only teeth to which he could venture to attach much importance are the upper central incisors of the permanent set. Now, as syphilis occasions an interference with the general development, it appears to me that the temporary teeth should present deformities as characteristic as those of the permanent set, as this morbid condition antedates both. Why, then, when all the other teeth, both temporary and permanent, are of similar formation and exposed to precisely the same influences, during the whole period of their development, should only the upper

central incisors of the permanent set present characteristic peculiarities?

I believe they result from the diseases of early infancy, which modify the nutrition of the dental germ. What is the disease? Is the disease diathetic, and does it give a peculiar shape to the malformations of the teeth? In my humble opinion, there is no special diathetic malady which produces a specific malformation of the permanent incisors. Any and all grave sicknesses of early infancy will produce this result. Neither syphilis, nor rachitis, nor chronic enteritis has any different influence. Hereditary syphilis or rachitis causes malformations of the teeth, not as syphilis or rachitis, but as a cachectic condition. It is as the result of a depraved nutrition, modifying the development of the dental germ, that syphilis produces the alterations of the permanent incisors, and not as a diathetic disease. Consequently, this modification of the dental organisms is occasioned by all the cachectic maladies of infancy. The disturbances that occur in the dental germ occur in the nails, the hair, and the bones. The nails become thin, then thicken, presenting the ridges attributed by Bean to dyspepsia, and which, with the return of health, disappear. The bones enlarge at the margins of the epiphyses, and rarefy, tending to osteoporosis. They soften, bend easily, and can not even support the weight of the child, so that it would rather lie abed, even after it has already begun to walk. The dental germs are subject to the general law and they become altered with the rest of the economy, whatever has been the cause which has affected the general nutrition of the patient. They suffer when all suffer.

Buchat, after a minute and careful analysis of one hundred and fourteen cases of dental malformation, states that when observed in association with hereditary syphilis, the deformity was due less to the syphilitic impression than to the influence of a cachectic condition; also, that of the one hundred and fourteen cases only eight could be attributed to syphilis.

When we consider with what delicacy and care we must conduct an examination of this kind, because rashness may not only cause ill-feeling, but may blight the life of the sufferer, we can readily appreciate what difficulties beset a physician in his endeavor to reach a correct diagnosis, so that it is only in a few cases, where parents acknowledge their syphilis and that of their children, or where the physician is able to have the child under his observation and follow it from its infancy, that we can make any but the most unreasonable hypotheses. To regard as syphilitic teeth the teeth of children about whose early life nothing is known, or of children who were not syphilitic but whose fathers once had syphilis, or children whose ancestors were not known but were thought to have been

syphilitic, upon the supposition that their parents may have been liable to acquire syphilis, may be very excellent to satisfy some pet theory, but I fear would rather be an obstacle to the progress of science. All hypotheses should be laid aside and facts alone should be brought forth—demonstrable facts, facts that can be proved. All that is doubtful should be purged from our records or set down in their proper place and called by their proper names,—suppositions, suspicions, assertions,—but not facts. Then will we all accept them with the proper reserve. I fear, with regard to syphilitic teeth, that there has been too much speculation. The alterations of the teeth are neither more nor less, in my opinion, than the result of a cachectic state. Syphilitic, rachitic, scrofulous, intestinal, or pulmonary cachexiæ, all interfere with the nutrition of the teeth as well as of the skeleton in general; likewise, in very young children, a long and painful illness. The eruptive fevers, associated with serious complications, or a chronic enteritis, will stop the development of the osseous tissue, causing softening of the bones, swelling of their extremities, rarefaction of their epiphyses, and alterations in the teeth.

These very conditions can be artificially produced upon birds by suppressing all the phosphates of lime from their food. The same result was obtained in a litter of pigs by premature alimentation and confinement in the dark.

Hereditary congenital syphilis or syphilis acquired shortly after birth can be the cause of dental deformities, but these can also be occasioned by a grave illness; for instance, any chronic disease of the intestines, stomach, or lungs, that may occur in early life. It is this systemic depravity—it makes no difference whether it be due to a chronic enteritis, scrofula, or syphilis—which causes this disturbance in the regularity of the movements of the bony nutrition. The specificity or the diathesis of the case is worth nothing. A disturbance of nutrition is the starting-point in all these alterations. Therefore, while the deformities claimed to be diagnostic of and peculiar to syphilis can result from syphilis, they can likewise be the result and more often *are* the result of a depraved or weakened physical condition.

Dr. W. H. Atkinson. The subject is of so much importance that it ought to arouse the interest of every member present. It is speaking of the foundation of changes in the structure of the teeth, and it involves all the differences between the syphilists and the anti-syphilists. The principal fault with the paper is that it and nearly all its references are of the mass character. Let us understand clearly the principles on which we build. If we look closely at the statements of the paper we shall find that they are frequently gratuitous. It

is said that the influence which causes the alteration of the teeth holds its course in the embryo, and may have special points for its manifestation. We must have a thorough knowledge of histology to attempt to lay down a course of treatment. If we do not know what the type is, we cannot tell when the typal requirements have been fulfilled. There is so great a variety of molecular changes whereby the food is converted into blood, the blood into pabulum, and pabulum into the tissues, that there is no fixed standard of healthy tissue. The paper contains more than we are able to grasp at first hearing. It starts with the postulate that the changes are due to one or two cachexiæ, forgetting that there may be a cachexia back of all others—bad habit.

Dr. C. N. Peirce, Philadelphia. The paper deals with facts as presented by our literature and by physicians. It is from mass observations, it is true, but from mass observations we can learn a great deal. It is certain that the markings on the teeth are called by the medical fraternity syphilitic, but observation has taught dentists that other causes can and do produce the same appearances. He rejoiced that the paper had taken up and presented the subject in an intelligent manner. Every observer knows that a child which has suffered a severe illness during the first six months of its life, as for instance, convulsions, must have the permanent teeth badly marked. If it is ill to the end of the first year, you will find the central incisors and sixth-year molars imperfectly calcified; the inferior incisors will be broad at the edge, and constricted at the neck. We find all the markings in this case which are laid down by Hutchinson as syphilitic. The speaker has over a dozen children under his care with these markings, and if there is any syphilitic taint it must have been at least five or six generations back. If the illness lasted during the time of the enamel nutrition, we have the permanent teeth deficient in quantity and quality of enamel. If the child's health was good until after the first year, and it then had an attack of scarlet fever or whooping cough, we find pits part way down the crown. If the illness did not come till after the crowns were perfected, during the time when the twelfth-year molars were forming, we find the markings on those teeth. These marks are so far characteristic that the dentist, if observing, soon becomes able to say to the mother, "this child was seriously sick at such and such a time of its life," and he can tell almost the month—certainly within two months—when the child suffered the illness.

Dr. Atkinson. Dr. Peirce rather gives the go-by to the necessity of a thorough knowledge of the histology of the tissues, and his remarks show the growing necessity of stimulating all, more especially the young men, to study embryology and histology, that they

may be able to know normal aspects, and thus recognize deviations from the normal types.

Dr. Peirce. "There is no difference between Dr. Atkinson and myself, but that I thought he did not appear to appreciate the object of the essay, which was simply an effort to bring before the profession correct ideas on a subject which is much misunderstood."

Dr. E. T. Darby, Philadelphia. In that very fact is its value. The impression is too general that deformed teeth are what are known as Hutchinson's syphilitic teeth. A child is brought to us with pitted teeth, and we see physicians frequently who recognize the syphilitic taint in these teeth, and are puzzled to trace it back to the source from whence it came. He (Dr. Darby) was glad Dr. Friedrichs had emphasized the points of difficulty. It is only rarely that we find cases of syphilitic markings. One of our leading dermatologists had called his attention to several cases of deformed teeth which had come under his observation, and by the aid of his assistant he had gotten models of a number of them. In several of these he is as positive as he can be that the deformity sprang from syphilis, and the speaker hoped at some future time to have some of these models of cases of syphilitic teeth where the authenticity is indubitable.

Dr. N. W. Kingsley, New York. In the cases of known syphilitic origin, what is the appearance of the teeth? Is there any uniform peculiarity?

Dr. Darby could not say that there was. The variations from normality seem to have no special irregularity, except that, as a rule, the teeth are more stunted, and instead of serrated edges, as taught by Hutchinson, they have a squared edge. The deformities are manifold, with little similarity in different cases. The lack of uniformity is usually found in the incisors.

Dr. Kingsley said, that was what he expected to hear. He had seen a great many cases of malformed teeth in children and youth which were undoubtedly congenitally syphilitic, but in no single instance had he ever seen on them the markings commonly called syphilitic, and he had long since ceased to attach any importance to those markings as indicating congenital syphilis.

Dr Frank Abbott, New York, had been watching for fifteen years to see a set of syphilitic teeth. The kind of teeth described by Dr. Peirce is far from that. Two years ago he had discovered a case in a child ten or eleven years old, in which was seen exactly the thing which Hutchinson describes. At the points the upper incisors were one-sixteenth of an inch narrower than at the necks. This was the only case that he had ever met which could be claimed as presenting the so-called syphilitic type.

Dr. Edgar Park, St. Louis. Were not the cutting-edges, laterally considered, concave?

Dr. Abbott. They were not. They were not shaped as teeth usually are, but were broader at the points. Their peculiarity was that the teeth looked as if they were upside down, being much narrower at the point than at the neck.

Dr. W. C. Barrett, Buffalo. It is a mixed question in both medicine and dentistry, whether congenital syphilis is shown by peculiar markings upon the teeth of the child. In one family that had been under his observation, the older children, born previous to the syphilitic infection, have regular teeth. In two that have been born since, the teeth are irregular, the tooth-substance soft, and liable to diseases; but the sigmoid shape described by Hutchinson is not there. Any changes there are, are in the character of the teeth, not in their shape. That syphilis has its influence in causing deformed teeth is undoubted, but it does not have so much effect as the eruptive diseases. The speaker had made a study of the skulls of the prehistoric races of America, and he looked especially for traces of syphilis. It is a mixed question as to whether syphilis was known on this Continent before the white man came. He did not believe that it existed. No evidence of syphilis was found in any of the skulls examined, except one, and there was good reason to think that this was not of the same antiquity as the others. In a large number of skulls of ancient Mexicans, Mound-builders, Sandwich Islanders, Peruvians, and some North American Indians examined, there was not a trace of syphilitic teeth.

Dr. Darby had neglected to state one fact in relation to the cases of which he spoke. All the models taken were from the mouths of patients in hospitals, from the lower walks of life. The gentleman under whose care they were gave special attention to learn if the mother had syphilis, and there is strong evidence of the truthfulness of the record.

The subject was passed.

(To be continued.)

At the annual election, held Thursday evening, Aug. 9, 1883, the following officers were elected for the ensuing year: E. T. Darby, Philadelphia, president; C. S. Stockton, Newark, N. J., first vice-president; T. T. Moore, Columbia, S. C., second vice-president; A. W. Harlan, Chicago, corresponding secretary; Geo. H. Cushing, Chicago, recording secretary; Geo. W. Keely, Oxford, O., treasurer; S. G. Perry, New York, W. N. Morrison, St. Louis, G. J. Friedrichs, New Orleans, members of the executive committee.

The president appointed as Local Committee of Arrangements,

F. M. Odell, M. L. Rhein, Jr., and C. F. Rich; as members of the Publication Committee, of which the secretary is *ex officio* chairman, S. G. Perry and A. W. Harlan.

Saratoga Springs was selected as the next place for meeting.

SOUTHERN DENTAL ASSOCIATION—FIFTEENTH ANNUAL SESSION.

The fifteenth annual session of the Southern Dental Association was held in the old City Hall, Atlanta, Ga., commencing Tuesday, July 31, 1883, at 10 o'clock A.M., President L. D. Carpenter in the chair.

First Day.

The morning session of the first day was devoted to routine business. In the afternoon, the committee to which was committed the revision of the constitution and by-laws, submitted their report and a draft of a constitution and by-laws, which was discussed, and after amendment, adopted. The most important of the amendments was one negativing the proposition to divide the territory of the association into districts, with the accompanying provision for holding the annual meetings in the various districts consecutively.

Second Day—Morning Session.

The committee on dental education reported two papers, respectively by Dr. Charles L. Steel, Richmond, Va., and Dr. L. C. F. Hugo, Washington, D. C., as worthy of being read before the association.

Dr. Steel read his paper, of which the following is a synopsis:

A dentist should be "one who is skilled in diseases of the mouth or teeth, or who professes to cure them." He is not a dentist who extracts teeth; many barbers do that, and the *best* dentists do least of it. He who simply fills teeth is but the skillful metallist, with the mouth as his work-bench and the teeth for his anvil. A well-educated dentist should possess the knowledge supposed to be comprehended in the titles, A.M., MD., D.D.S. Many may laugh and call this high-flown, but the writer believes in putting our standard high. Then, if we strive faithfully to reach that, we will be so much the better off, even though we do not reach the goal itself. He did not mean the simple *possession* of these degrees, when their owners have only a superficial smattering, but he did mean the intelligible possession of such a liberal education as one will inevitably secure by a studious attention to the courses of lectures in good literary, a good medical, and a good dental college. He would suggest that they be attended in the order named. Our student should be con-

versant with modern languages, particularly French and German. We know the Germans to be deep thinkers, the French to be earnest experimenters, and the Americans to be intensely practical. Let us, Americans, fit ourselves to apply the results of German thought and French experiment. Many men are graduated annually from our colleges, to whom Latin and Greek are, indeed, dead languages, French and German anything but modern, and a chemical formula a Chinese puzzle. But if we watch these men we will find that, unless recognizing their deficiencies, they try to improve themselves and keep abreast of the times by subsequent study, at the end of say twenty years, they are practicing nothing except that which they have not forgotten of the instruction given them at college, and, in the meantime, they have never contributed one iota toward the advancement of their profession. Doubtless some will say that many young men have neither the time nor the means to take this course. The writer would be the last man to discourage any one from entering our ranks; but he did believe that most men can find the opportunities to get the education suggested. They may not graduate at twenty-one or twenty-two, or even twenty-five years of age; and they would far better go through on the slow-moving and oft-stopping accommodation train, and know something of the road over which they have traveled, than rush through on the lightning express and retain only a dim, confused idea that certain fields have been passed by. To bring this about, preceptors should impress upon their pupils the importance of a broad, liberal education, and should, so far as they are able, aid them in obtaining it, and should discourage any tendency to hurry through by such short-cuts as "preliminary examinations," or so-called "five years' practice." But the chief means to which we must look for aid are the colleges. Many of these seem to have the idea that a large list of graduates constitutes success. Let us not concern ourselves with the list of graduates, but rather with what the schools require of their pupils, and what they are prepared to do for such students. Let us watch the course of the graduates and see what evidence they give of proper training. Some of the schools need fewer professors and more teachers. The examinations should be thorough, but still within the reach of every man of ordinary good sense who has studied properly. The colleges should give to the young men the opportunity of gaining a thorough and extensive knowledge of the branches which they claim to teach.

Concluding, the paper advised young men intending to enter upon the practice of dentistry to, first, get as good a literary education as possible. 2d. Take a complete medical course, if possible. 3d. Finish your collegiate career in some reputable dental college. 4th.

If possible, on leaving college, get with some older dentist who can aid you in putting your theory into practice, and by whose experience you may profit. 5th. Never stop studying. The months and sometimes years of weary waiting for practice will, to the educated man who knows how to rightly use his time, prove a blessing rather than a curse. It gives him time to enlarge upon and carefully digest the knowledge acquired in college.

In the absence of its writer, Dr. Hugo's paper was read by Dr. E. Wagner, Montgomery, Alabama. The following is an abstract:

Dr. Hugo's paper was entitled "Thoughts upon some Questions affecting the Professional Standing of Dentists." It considered first the educational problem. The dental practitioner of to-day recognizes that there is something seriously wrong in dental education. The dental colleges, though censurable in many respects, are the victims of most unfavorable circumstances, but they are doing as well as ought to be expected. The standard for graduation is low, because the requirements for admission and graduation must of necessity be few, in order that the average capacity of the candidates may be accommodated, and because the colleges do not enjoy the benefits of statutory protection. To remedy these evils the dentist should see that the young man whom he takes under his pupilage has, at the least, a thorough common-school education. The preceptor should then remember that it is his duty to teach in the laboratory as well as in the operating-room, rather than to let the pupil find out. The pupil should enjoy the crystallized results of the best experience. If preceptors would do their duty by their pupils, the colleges would have students who could accept higher and more thorough instruction, and of whom a stricter and more comprehensive examination could be demanded. The colleges should be protected by legislative enactments. Twenty States have made a step in the right direction by enacting laws which require the dentist to possess a diploma or a license. And yet they have not gone far enough for the good of the profession at large: *every dentist ought to have a dental diploma.* Would it not procure for us professional entity if there were but *one recognized*, *legitimate* way of becoming a dentist? When all dentists are obliged to be *dental graduates*, all the evils of dental education, private and public, will be concentrated in one place, where they can be vigorously and effectively blotted out. In the present lax condition of affairs, from want of proper protection, our colleges are reduced to a quasi-commercial competition. Once their independence is secured by laws compelling all incoming practitioners to possess dental diplomas, the faults of the colleges could be attacked without mercy, and be forced to yield

to the demands of a rapidly progressive science; the course could be lengthened to three years, the curriculum could be made more comprehensive and be more thoroughly taught, so that a student upon graduation might be prepared to begin the practice of oral surgery and oral prosthesis. The endowment of the colleges would be of great benefit in confirming any progress made by the reforms first spoken of. The endowed institutions of the legal, medical, theological, academical, and scientific world, maintain the highest standard.

The next subject considered was the question, "Is Dentistry a Specialty of Medicine?" Dr. Hugo would answer the question "yes" and "no." Undoubtedly, by origin, we belong to Medicine, but as undoubtedly by development we belong to ourselves. Dentistry is a specialty of the healing art. In the light of practical importance, however, what does it matter to us if dentistry is or is not called a "specialty of medicine," or a "specialty of surgery," or a "specialty of what-not?" This much is certain, that the salvation of this nondescript has been and ever will be in her own hands.

Considering the objection urged against dentistry by physicians, that it is unprofessional, because it is merely mechanical, the paper contended that the operations of the dentist were in no sense more "merely mechanical" than those of the surgeon. Does not the surgeon use needle and thread, hooks, nippers, knives, saws, chisels, etc.? We know that he uses these tools with his hands—yet his is a *professional pursuit!* Is our vocation any the less professional because we attend to certain lesions in man's physical nature, while the surgeons (and the physicians) attend to others? True, there is a vast difference between our treating antral abscess, or a broken jaw, or cleft palate, and the surgeon's performing capital operations. Yet, in all cases, the hands are used, and their work gives executive expresssion to the trained, remembering, thinking, reasoning, concluding, directing brain. Certainly the mechanical does not play an ignoble part in the all-claiming science of medicine; for surgery, until within a short time, was almost the only stable and positive element in the Esculapian's calling. In examining medical practice for the last thirty years only, we must acknowledge that medicine has been but too long a "blindfolded man with a club in his hand," though thanks to the great progress of late years in physiology, pathology, and histology, the man with the club is beginning to see where and when to strike. The paper then instanced some of the most marked changes in methods of medical treatment within thirty years, as illustrating the fact that, while the mechanical element in dentistry can at its worst be dangerous only to the dentist's claims of professionality, the tentative element in the physician's work can become dangerous even to human life.

The physician also says we send young men to college who lack the rudiments of even a common-school education; that anybody, whether qualified or not, can hang out a shingle and thus become a "doctor" with all the "privileges and emoluments" of the dental profession, and further, that about two-thirds of the dentists are made in this way; that we advertise in newspapers a price-list of our fees; that we make known our calling by shop-window exhibitions; that we notify the public of our occupation by means of two silver-plated signs, a swinging sign, and two side-signs—all at the street entrance, within a radius of five feet; that at some dental establishments teeth are extracted, with the gratuitous removal of alveoli and portions of the jaw-bone—all for fifty cents a tooth, gas and street-car tickets thrown in.

"Does the physician manufacture these things against us? These are extreme cases, you will say. Very true; yet those persons alluded to are dentists, and the dental profession as a whole suffers for their shortcomings, since the line of demarkation between the truly professional gentleman and the blatant charlatan is not quite decided enough to be distinguished by the general public. I am well aware that there are physicians who advertise, who adorn their offices with a multiplicity of signs, who professionally cut each other's throats, who lend themselves to abortionism, etc.; but my object is not to point out the defects of others. I wish only to bring home to our realization wherein we sin and where our professional standing is suffering. Of course we cannot be expected so soon to have attained even approximate perfection; but I think we are blamable for the eradicable blotches defacing the otherwise fair escutcheon of our profession."

Let us now bestow for the benefit of wholesale, undiscriminating detractors, a few words upon the science of dentistry as we find it in the abstract. The impartial observer is most forcibly struck with the marvelous development of dentistry since 1840; that is, since its separation from medicine. Truly disheartening and inauspicious were the circumstances attending the beginning of independent rational dentistry. In view of the record of the medical fraternity in connection with all the great revolutionary discoveries of modern times, the opposition which Chapin A. Harris met with when he proposed the development of and radical changes in the treatment of the teeth—the "dental experiment," as medical bigwiggery was pleased to dub it—was to be expected. Dentistry had, indeed, an humble start in life, but humbleness is the beginning of all greatness. The beginning is the center of an ever-increasing ball; perseverance and time are the centrifugal forces; greatness is the expanded sphere. Within forty years dentistry has revolutionized the treatment of the

oral cavity. It has introduced more humane instruments and practices. It has saved myriads of defective teeth—restoring them to usefulness—that under medical care would have been relegated to the tender mercies of the turn-key. It has passed its magic wand of salvation over all lesions of the mouth. It makes substitutes for lost oral organs more perfectly restorative functionally and esthetically than the products of any other prosthetic art. And last, but not least, it has bestowed upon mankind one of the greatest blessings since the introduction of vaccination—the employment of anesthetic agents for surgical operations. In a word, dentistry of today is the product of a beneficent change from undiscriminating, spoliative, radical cures, to intelligent, conservative, restorative cures; from what was the *avocation* of a physician, a barber, or a blacksmith, dentistry has developed into the legitimate, expanded *vocation* of a man who makes the case of the oral cavity his especial and engrossing life-study; from a crude method of practice it has become an exacting, rational art and science. Judged by dental science in the abstract, the standing of the dentist ought to rank equally high with that of other specialists of the Healing Art. It lies with the representatives of dentistry, with their more elevated, more truly professional bearing, and more thorough and liberal education, whether dental science, judged by the dentists, is worthy of belonging to the learned professions, or whether it is to be classed as a branch of skilled labor. The science has done its duty; let the men representing it do theirs.

Dr. W. H. Morgan, Nashville. Both the papers we have just heard read are to be commended, and both are worthy a place in the archives of the Southern Dental Association. The first is a little radical in some things. Its writer has reared an ideal edifice to cover dentistry, which may never be reached. The paper is radical in its requirements as to preliminary education. If the A.M. were essential, at least two men who have been President of the United States would never have reached that eminence. Taft produced his work on dentistry, which has been for many years a standard text-book in the dental colleges, before he had the degree M.D., and the speaker believed he never had the A.M. Yet he is one of the brightest men in the profession. Had that requirement been insisted on when he (Dr. Morgan) entered dentistry it would have cut him out, and he did not think he had disgraced the profession. So much in that direction. Our dental colleges are not responsible for the condition of education, and they have caused most of the improvements that have been introduced within the last forty years. If all the gentlemen who find fault with the colleges had been in the position that the speaker had

occupied for the last few years, and had seen the maneuvres resorted to to obtain the college degree without fulfilling the requirements, they would estimate the colleges higher. They have applications from every quarter, which shows a high appreciation of the colleges as representing the standard. Gentlemen who have served in the various State boards of examiners know what the influences are which are brought to bear to compel them to deviate from a proper standard of requirements. He did not approve of long studentship in a private office for the intending college student; but would prefer to take the students raw. If they have been long under a preceptor there is much to unlearn, as a rule. Of course, there are exceptions; some men prepare their students thoroughly, and when properly taught by the preceptor, the student has a great advantage over those who come raw; but a majority of those who come up to the colleges from private preceptors have been injured by the experience. In the last class graduated from the institution with which he is connected there were four raw men,—that is, men who previous to their attendance upon the college sessions had no knowledge of dentistry,—and they were examined with men who had had from ten to twenty years' experience in practice. The raw men had an average of from 80 to 90 per cent., while the others were just able to pass. Such facts speak for themselves. There is a general complaint that the curriculum is not broad enough. When the dental profession make a demand for a broader curriculum it will be complied with. Some contend that the dentist should have the medical degree as a basis, the same as the oculist, the ophthalmologist, and other specialists in medicine. The speaker took the ground that the oculist would be better taught by the professional oculist. There are many things taught in medicine which are not needed by the specialist. They only serve to make him broader and higher; they are desirable, but not necessary. Take yellow fever, for example; of what value would a knowledge of its treatment be to the dentist? None whatever. But everything that will tend to make him a better dentist should be taught to him and explained to him in such a manner as to make him master of it. The scheme of dental education is constantly being raised higher and higher as the needs of the profession require it. When the speaker attended college there was no course on chemistry—only a smattering by the professor of materia medica. In those days no course on anatomy was given; it was not recognized as necessary. To-day both are taught in every reputable dental school, with other studies which have from time to time been adjudged necessary to the complete dental education.

Dr. J. R. Walker, New Orleans. Dr. Morgan has criticised the paper of Dr. Steel for requiring the A.M. before beginning the

special dental education, and has cited instances to show that the education which it implies is not essential to success. Those whom he has thus held up to us were men of genius, and you can't make laws to govern genius. It is above law. What is sought is to prescribe rules by which the course of the man not gifted with genius shall be guided. Dr. Morgan and he (Dr. Walker), with many others of the older men in dentistry, have felt the disadvantages of the lack of early education. What we require to secure the best dental education is a good strong guard at both doors. The student who enters a dental college wants a good preliminary education so as to be able to receive and assimilate the instruction offered, and thus get every advantage of his position. Some things which he should learn he will not be required to put into daily practice, but the relations of the oral cavity are such that the man who has the knowledge that should be possessed by every medical man has a very great advantage over his neighbor who is without that knowledge. The interests of the dental profession, as well as of the public, require the very highest knowledge on the part of the practitioner that is attainable, and the time is fast coming when nothing less will do.

Dr. B. H. Catching, Atlanta, Ga., thought Dr. Morgan in his remarks had laid himself wide open to criticism. Dr. Steel's paper was one of the best he had ever heard. Dr. Morgan says that when a demand for a higher education is made by the profession, the colleges will accede to it. That demand is being made every day, and has been made for years, but the response on the part of the colleges is not satisfactory. The recent establishment of a dental school in Chicago, which will graduate in dentistry those only who have previously received the medical degree, is an advance step. What success the movement will have, time will show. It seemed to the speaker that Dr. Morgan had about-faced from his former position on the question of dental education; when his (Dr. Morgan's) son was preparing to practice dentistry he graduated first in medicine and afterward took the dental degree.

Dr. Samuel A. White, Savannah. The duties devolving upon preceptors, who undertake to prepare students for college or for practice, seem to be not fully appreciated by them, as a rule. He knew of a gentleman who at the time of opening his office for practice had never extracted a tooth in the presence of his preceptor. He thought it was the preceptor's duty to see all these things—all the ordinary operations—performed by their students.

Dr. R. B. Winder, Baltimore. Speaking of that school which has been held up here as a model for others, it seemed to him that it is rather going downward than upward. One of its requirements is that its graduates shall possess the medical degree, but it advertises

itself as the dental department of an infirmary. In acquiring a dental education, as in acquiring an education in any other direction, the first requirement is that a man shall master the essentials of success in the avenue he has chosen. Then, after acquiring these, if he has the means and the time, let him widen his field; let him take the medical degree. This is his high privilege and his duty to himself and to the public. Some of the things which are sought to be taught in the schools are not essential, but they go to make up a wider and broader man.

Dr. Morgan said, if he had the announcement of the Chicago Dental Infirmary with him, he would undertake to show that it proposes to graduate men who have not the M.D. He expected to bring it, but found he had overlooked it. He heartily wished that every dentist had earned his M.D. before going on to dentistry; not that he believed it would have made him any better dentist, but it would have made him a broader man. A classical education is not always an advantage. We have no less an authority than Charles Francis Adams on record as opposing the teaching of the dead languages. Americans are practical, and we are indoctrinating the whole world with our practical ideas. A thorough collegiate course sometimes disqualifies a man for a practical life, though this is more frequently seen in other directions than in our profession. Students spend their time in delving into things that are of no use to them practically. But it is said we must develop the mind. The better way would be to spend the time in technical studies and develop the mind in that direction. What we, as dentists, want to know, is that which we shall use practically first. The laws of physics are not of the first importance to the dentist. Let him know all of these if he can, but let him first know what will be of practical value to him in his profession.

Dr. Catching replied that he only spoke of the Chicago school as an effort to advance the standard, in requiring its graduates to possess the medical degree. If it succeeds, he should be glad; if it fails, he should be sorry. Dr. Winder recommends that students should have a medical education.

Dr. Winder. Only to such as I think it would be an advantage to.

Dr. Charles L. Steel differed with Dr. Morgan as to the necessity of a classical education for the dental student. It is a great advantage to any one pursuing the higher branches of education in whatever direction. Take physiology and anatomy, for instance. One having a classical education can take them up and read them understandingly; without it, his study of them is a matter of slow work and much difficulty. A year or two spent in acquiring the necessary preliminary education is well repaid by the more rapid progress made.

Dr. W. H. Richards, Knoxville, Tenn., thought it was about time the old dispute as to whether dentistry was or was not a specialty of medicine was laid on the shelf. We are constantly growling about our non-recognition by the medical profession. When we get sufficient knowledge of oral surgery, the medical profession will recognize us as competent for consultation; when we have the proper acquirements, the physician will refer his patients to us when they need our services. The speaker believed in an advance in our attainments as doctors of dental surgery. General information doesn't hurt any man. As an instance, when at college the professor of anatomy was giving some illustrations in comparative anatomy by means of fishes' teeth. One of the students exclaimed, "What do I care about the structure of fishes' teeth? I don't expect to plug teeth for fishes." When examination day came the student who didn't expect to fill teeth for fishes failed. A young man, fresh from college, goes to a town to locate where there is an old practitioner, who though having no diploma has had years of experience, and whose wisdom with regard to the teeth and their diseases the people never questioned. By and by, while the older practitioner is out of town, one of his patients comes to the young man with an aching tooth, with the request that it be extracted. The young man makes an examination, and says the tooth should not come out. This is exactly contrary to the advice which the old practitioner has given in similar cases. The young man sees fillings done by the older one in years gone by, by hard work, when he was making his reputation, and he sees those made in later years when there was no necessity for the laborious care with which the work was formerly done. Thus the older man teaches the younger to slight his work.

Dr. G. J. Friedrichs, New Orleans. It is conceded in these days that the degree D.D.S. is necessary to the dentist. This has been brought about partly by the profession. But there is something behind the profession, the public, who are somewhat posted in the matter, and to whom a degree is a safeguard. It is the public who are to be protected, and to them the degree is an introduction, inducing confidence in the attainments which its possession implies.

Dr. S. G. Holland, Augusta, Ga. Dental education is simply training the mind and hand to do dentistry, which is, to do operations for the best interests of our patients. In order that the greatest good shall be accomplished we must have proper subjects for dental education. He does not care how a man gets his education so he gets the necessary knowledge. In the first place he should be a young man who has the instincts of a gentleman. Next, give him a foundation for the practical studies. He did not care whether dentistry is taught

him as a specialty of medicine or not; whether you call it going through a medical course, or studying anatomy. He thought it better, as a rule, to give him a broad foundation by going through medicine, though it may not be necessary for every man. Life is too short to permit us to do more than one thing perfectly. When we get this thoroughly impressed on him he will get down to the work and come out a good operator.

Dr. Morgan. Does not Dr. Holland know that the dental schools teach physiology, materia medica, and anatomy, as well as they are taught in the medical schools, and isn't it begging the question to insist that it should be done in a medical college? In our school we do not allow students to come forward for examination until they have a thorough knowledge of the subjects upon which they are to be examined, and this is probably the case in the other schools.

The subject of dental education was passed.

Adjourned.

(To be continued.)

The annual election was held Thursday afternoon, August 2, 1883, and resulted in the choice of the following: H. J. McKellops, St. Louis, president; A. G. Bouton, Savannah, Ga., first vice-president; M. A. Bland, Charlotte, N. C., second vice-president; A. O. Rawls, Lexington, Ky., third vice-president; J. P. Holmes, Macon, Ga., corresponding secretary; W. H. Hoffman, recording secretary. H. A. Lowrance, treasurer; A. O. Rawls, R. B. Winder, J. R. Walker, E. S. Chisholm, W. R. Clifton, executive committee.

Lexington, Ky., was selected as the place for the next meeting, and the date the first Tuesday in May, 1884.

NEW YORK ODONTOLOGICAL SOCIETY.

(Continued from page 423.)

Dr. Clowes. Mr. President, we have heard some very interesting statements to-night—one is in reference to arsenic being a bad thing when applied to a tooth. Now, the fact is that practically it is so good and safe a thing that I could employ it upon the teeth of any denture in this room, devitalize the pulps and not have the least irritation afterwards; neither inflammation, nor pain, nor ulceration need follow, and yet our friend sees danger in arsenic.

Dr. Dodge. Mr. President, it has latterly seemed to me that I see a great deal more of that form of pericementitis which we know as Riggs's disease than I used to when I began to practice twenty-five years ago. Perhaps I see sharper. I have been for a good while

trying to make up my mind where it comes from. I have not made up my mind, and I have not learned that anybody has made up his mind in regard to that point, but it grows upon me that there must be a constitutional condition behind this thing, and that if we were to set ourselves with all our might to look into it we should find something in the habits of society that prevail in New York, and in certain constitutional taints that may be extensively diffused here; certain conditions into which persons fall through sheer weakness; something of a constitutional kind that would explain this thing, the knowledge of which would enable us to prevent rather than to cure the disease. They keep coming to me week after week, and I apply the remedies that I have found most effectual for the relief of the symptoms, but I do not feel satisfied, and I believe that most dentists are in pretty much the same state of mind. It seems to me that I have been feeling around the edge of something that I would like to get hold of with both hands and cannot find out how to get hold of it. I would like to start the question whether anybody has any light of a practical kind to throw upon what evidently lies behind this diseased condition.

Dr. Atkinson. Mr. President, the questions are profound, and to deal with them intelligently we want a profundity of apprehension that does not seem to be epidemic. If I were to give a prescription to prevent Riggs's disease I would say: let children chew hard substances from the time their teeth are erupted until they cease to need the use of them. The debility, in my estimation, is introduced through the door of the inaction of the masticatory apparatus, in all instances. The same thing holds good in hypercementisis, or those cases that have been presented here under the name of exostosis of the roots of the teeth. We cannot state much that will amount to anything as to apprehending the nature of the case unless we understand the coalescence of the seen with the unseen. We must know how soft pabulum is converted into the various tissues, and what the process of tissue-building and tissue-feeding is, before we can arrive at any competent conclusion in such cases, and if it were not that our affections lead us further than our intellects, we would make a pitiful showing before any competent jury in diagnosing these questions. We have the amalgam question here, and the amalgam question is not an amalgam question at all, any more than pain in a tooth is tooth-pain. It is the mercury in the amalgam, (if amalgam ever does any mischief), which produces salivation and inflammation in that neighborhood, that has been called inflammation of the periosteum. Almost all the testimony in reference to it is misleading. We do not understand that the inflammatory process for the reproduction of tissue is a reversal of the nutrient activity that originally built

the structure. Those men who have seen a section under a microscope go on blundering and talking baby-like nonsense, jumping from one category to another as if there were any real relationship between them; as if it were possible for a dead substance to be absorbed into a living, or into the canaliculi of the cementum, as mentioned in the paper. In the embryonal corpuscles, constituting the neural contents of the cancelli in the soft bone, the seeker will find oil-globules, but I will give him a Delmonico dinner if he will show me oil-globules in any normal bone exostosis, as he calls it. We are too much involved in deep water in these investigations to permit us to satisfy the queries of individuals who have stolid convictions and surface intellects, and who let their discriminations entirely go by the board. In the pathology and surgery of the past, in the text-books that have been written, the teachers dwelling upon the inflammatory process have talked about matters that have been expunged long since, but still some men hang to them. We say antiphlogistic. That term occurred from an apprehension that there was something in an inflamed part that was called phlogiston, that was producing the mischief; and they were right. It was a slow burning, and that which caused an allaying of the burning was called an antiphlogistic. It is really an oxidation of the elements, one which produces,—what every other fire does,—ashes, carbonic-acid gas, and water. Such is the work of every inflammation, as veritably as there is combustion in the fire-place. Hence it is just as accurate to say "shin-pain" as it is to say "tooth-pain." If you say pain in a tooth, I will accept that. I have the same objection to the term neuralgia. All pain is perceived through the nerves, and must be neuralgia, must be pain, *per se*, in the nerve. The president said that we were dealing with a profound subject when talking about pain, and that is true. Pain is not inflammation, and inflammation is not pain. It is a disturbed condition of the nutrient activity whereby a reversal of the nutrient process has taken place, and the elements of the tissues become reduced back to their embryonic character. Where this inflammatory process is going on the tissues swell and press against the nerve tracts, dividing the waxy material, or neurine, which is the conductor of the nerve-currents, so lessening its capacity for conduction that it cannot convey the full current with a sufficient degree of celerity, and then it becomes pain. It is like driving a flock of sheep over a bridge that was intended to take two or three abreast, but which has been reduced so that one or two only can pass at a time, and they become crowded. It is a crowding of the currents of nutrient activity of the sensory nerve that produces pain. They *are* profound questions, but they are perceivable and understandable if we would give them the attention that we give to many other

things of our lives; and with proper attention to them we would make fewer blunders and be less dogmatic in our statements. Many times a pain is raised that is nothing but reflex action, or, if that is not understood, sympathetic action with the seat of the mischief, and hence we refer the pain to a seat in which it is not. I have had patients ask me to extract a lateral incisor, saying they knew what tooth they wanted out, and after an examination and being unable to find any trouble in that tooth, I have found, perhaps, a third or a second molar with a cavity in it, and when I touched it they would say, "there, I told you so, now take it out." They were deceived by a process of reflex action which seemed to locate the pain in another place than the real seat of the troubles; the question was too profound for them, they did not see the relationship of things, and did not mentally interpret rightly the cause of the trouble.

Remedies have been spoken of, and some have been named, and I can testify to their efficacy,—I beg pardon—I can testify to the relief of pain after the application of the remedy; I cannot say that it was the application of the remedy that brought the relief. Why I cannot say that is because I at one time applied a remedy which was not the one at all that I thought it was, and it cured the patient, or at least, the pain ceased when I applied it. What was it that relieved the pain in that case? I just put a little water into the cavity, thinking I was putting in a potent agent. Was it the intention, the purpose on my part, or was it the expectancy of the patient that soothed that pain so that it did not return? We ought to be a little careful about deciding what is a remedy and what is not until we understand more about the molecular changes which take place in health and disease. We will then be better able to discriminate what remedies to use for the relief of pain, and we will be better able to talk intelligently of these matters than we have been heretofore. It was said that sweets cause the teeth to ache where the dentine is exposed, irritated, and softened. Retrogressive metamorphosis of tissue had been set up, and the lime-salts dissolved to a certain extent, and if you apply sweets, such as sugar, in such a case, the pain is aggravated. Now, how does that aggravate the pain? And if, while the pain is severe, you put some pure glycerin into the cavity that has been cut down to the solid dentine, it will produce a sharp, stinging pain. How is that brought about? It is caused by the affinity subsisting between the water in the tissue and the glycerin, the hunger that the glycerin has for water. Therefore, if you so use glycerin, always satisfy its hunger for water before applying it to the sensitive, living substance of any of the tissues of the body. The great obstacle to our regular growth is the assumption that what we have already attained is final. We think we have

attained the whole truth, when in fact we have only attained the truth so far as we have gone. We give ourselves the credit of understanding beyond what we do really understand, beyond what has been properly thought out.

The President. Suppose a patient comes to you in a paroxysm of pain which is undoubtedly caused by an exposed pulp, and you feel sorry for that patient and desire to give immediate relief, what have you found, from your great experience, to be the remedy that will soonest make that patient comfortable for the time being?

Dr. Atkinson. If the pulp was actually exposed I would not hesitate to take a sharp excavator and excise the exposed portion. In most cases that would give relief instantly.

The President. Suppose it was not entirely exposed or but slightly exposed, what would you do?

Dr. Atkinson. Then I and the case should depend upon the inspiration of the moment to know what remedy to use. My first step would be to remove all the abnormal and foreign substances from the cavity and to wash it out with warm salt water,—never with pure water, but always having the water nearly as saline as sea-water and about blood heat. After you have washed out and excavated the cavity, if the pain was caused by a fermenting process going on there, the pain may be soothed by the warm water; if not, and the pain still continues, then I would use some of the carbolates or any of the carbo-hydrates, such as oil of cloves, eucalyptol, creasote, or carbolic acid. Most of the remedies that we have used have greater or less disinfectant or escharotic properties, and before you have run the round of four or five of them you would very likely find one that would control the case. If it is really pulpitis, I have found that tincture of aconite will generally control it very readily, and sometimes chloroform—just enough to change the nerve-current—will relieve it. There are a great many ways, but I could not tell you anything that would be definite without seeing the particular case. I am confining myself now wholly to the inflammation of the pulp—local pain in the pulp—without reference to pericementitis at all.

Dr. Kingsley. One remark of Dr. Atkinson's I should like to refer to. He testified to the efficacy of a remedy that had been proposed by the reader of the paper, and then corrected his testimony by saying that he had seen certain good results follow the application of it, but could .not vouch for the efficacy of the remedy. Again, toward the close of his remarks he spoke of applying certain remedies for the cure of pain from exposed pulps, and of trying this one and that one and the other one until he had gone the rounds, and he said that probably by that time the pain would cease. It

struck me that if he did not know that the remedy in the first case cited produced the result that followed its application, what was the use of applying such a remedy? And then the question comes up: Do we any of us know at any time the relation that exists between the application of the so-called remedy and the result that follows, or are we not in the dark all the while? When he put a little water into the tooth and cured a toothache, and then asks why the pain passed away, I might also ask why, in nine cases out of ten when a patient calls on a dentist, does his toothache cease the moment he pulls the door-bell? I have reflected upon the subject of the application of remedies and their results, and have seen such various results follow the application of the same remedy, and again no result, in apparently the same kind of case, from the same application, that I am almost a complete skeptic in regard to all medical remedies. I have been trying for thirty years to get some real knowledge about these questions, so that in giving a remedy I would always be able to produce certain results. I am glad if, in other and more experienced hands, they do always produce certain results, but somehow they do not in mine. Dr. Clowes told us what he could always do with arsenic—always, every time. And Dr. Clowes was telling not long ago before another society that he could always and in every case remove every single particle of dead pulp from the canals of every root; yet here is a gentlemen of high standing in the profession, the gentleman who read the paper to-night, who says that it is only in a moiety of cases that such things can be done. Are we, therefore, to consider that Dr. Clowes is, as a dentist, so far superior to everybody else? Is it not amusing to listen to these discussions? Is it any wonder that after hearing them one does not know much more than he did before?

Dr. Clowes. The remarks of our friend Kingsley remind me of what occurred at one of our meetings several years ago. I had stated that "contact among human teeth was always dangerous," etc. He followed me by saying that I had declared contact a *cause* of decay, and then very beautifully explained what needed no explanation—that it was not *per se* a cause. To-night the gentleman tells us I have claimed to remove every particle of dead pulp from a tooth. You will see he is at it again. Now, I have never said any such thing. I was but recently reading the proof of what I said, and these are the words: "*You must remove all that you can, and if any portion be left in the nerve-canals you must disinfect it.*" No one can remove all the pulp from some teeth, but we can disinfect what little remains and make it harmless.

Dr. Rich. How are you going to disinfect it?

Dr. Clowes. With chloride of zinc or creasote or both together. I have always had satisfactory results from these.

Dr. Francis. Many times in the course of my practice I have had patients call upon me seeking relief from pain in their teeth, when they were unable to locate the seat of the pain. I recollect a patient calling upon me many years ago, requesting me to extract a superior twelfth-year molar, which he said was aching violently. I examined the tooth, but could see no reason why it should give him pain. He insisted, however, that I should extract it. Of course I declined. I made some application to the gum which seemed for the time to relieve him, and he went away. The next day he returned, stating that the tooth-ache had recurred, and that I must remove the tooth. There was a small tin-foil filling in it, which had been there probably many years. Thinking that there might be some defect beneath it, I removed it, but found no trouble there, as the dentine appeared to be in perfect health. I made another application which seemed to give relief, and he went away. He called again the next day after, and was determined that I should take the tooth out. He said he had recently parted with the first molar and a bicuspid, which was very evident from the vacant spaces, and he wanted this molar removed also. He declared that the pain was in the upper jaw, and in that tooth, but, after thoroughly examining it, I could detect no cause of trouble there. I then examined the lower teeth, and found a third inferior molar partly concealed by the gum; I lifted the gum from it and discovered a deep cavity, which proved the source of his trouble. He had already lost two valuable teeth unnecessarily, and if he could have persuaded me to remove them he might have lost half a dozen more good teeth without remedying the difficulty.

Another case. A lady was conducted to my office by a friend, who resided in California, but was then visiting this city. She came into the office with tears streaming down her cheeks, and my friend told me she was suffering from tooth-ache. I got her into the chair and asked her which tooth was giving her pain. The reply I received was, "Here," with a movement of her hand in the vicinity of her head. That did not aid me very much, and yet I could get no further assistance from her. I examined the teeth one by one, and finally concluded that the pain proceeded from an inferior bicuspid which contained a plastic stopping. I removed the stopping, and found this tooth to be the cause of the trouble. It was a case of pulpitis. The lady imagined that the pain proceeded from her superior molars. I presume that all of you have had similar cases.

Dr. ———. May I ask Dr. Francis what he did with the third molar that was aching?

Dr. Francis. I removed it.

Dr. Dodge. The paper of Dr. Abbott has been exceedingly inter-

esting. There are cases of a decidedly neuralgic nature, the symptoms of pain being located at the side of the head and face, and having no apparent connection whatsoever with the teeth. Probably I can best describe such cases by relating one or two that have come under my observation within a short time. A lady came to see me a few months ago, saying she had been treated for about eight months by a physician for neuralgia. She had suffered so exceedingly that —her physician having told her that possibly her teeth had some connection with it—she was ready to have every tooth in her head out rather than suffer longer the pain that she had endured for the last eight months, and which had made her life miserable. Up to that time she had enjoyed the best of health, and since that time she had been wretched. After thoroughly questioning her as to the symptoms, I examined every tooth, and I came to the conclusion that a second bicuspid in the lower jaw was the cause of the trouble; and the reason of my coming to that conclusion was that all the ordinary remedies seemed to have failed in giving the least relief, and that on percussion that tooth had a decidedly different feeling from any of the others. I removed a filling from that tooth, and the moment I did so a quantity of pus, perhaps equal in size to an ordinary pin-head, was forced out of the pulp-chamber. The pulp was alive, or a portion of it, so much so that it was decidedly sensitive when I attempted to introduce a broach into the pulp-cavity. At that time I washed the cavity out with tepid water, and applied creasote and afterwards arsenic, then extracted the pulp and filled the root. The neuralgia ceased from the first application of the creasote. I have seen the lady frequently since, and she has had no return of the neuralgia.

Another case occurred, perhaps a couple of years ago, in which I received a note from a physician to come and see a brother physician who was confined to the house, and had been for three days, with a neuralgia which refused to yield to any of the ordinary remedies. I went to see him, and he told me that it had been suggested by some medical friends that possibly his teeth were at the bottom of his trouble, but he did not think so himself. He had been to his dentist who had examined his teeth thoroughly without discovering that there was any disturbance or decay in any of them. I examined them, and I determined, from the symptoms, to remove an amalgam filling from the first lower molar on the left side, and I found there pretty much the same condition that I have described in the other case. An application of creasote seemed to stop the pain at once, cured the neuralgia, and there has been no recurrence of it from that time on. And I think that if there ever was a person really grateful for relief from pain that man was at that time, and

has been ever since. I see that this question of to-night has been agitated lately and brought to the notice of physicians. A number of friends have spoken of that class of cases which they are called upon to treat from time to time; and, while the cause is obscure and requires, perhaps, a careful inquiry and examination to find it, yet I think that in the vast majority of cases of facial neuralgia which do not yield to the ordinary remedies we may look for the cause of the trouble in the teeth; and sometimes by a dentist attempting to do something, or doing something without really having any special reason for it, it may result in just such disastrous blunders as in the case related by Dr. Francis, in which a gentlemen lost two valuable upper teeth when the cause of the trouble was in the lower jaw.

Another case, which a physician related to me, the case of a lady, the wife of one of the best-known men in the city, whom he had been treating for neuralgia for some time. Occasionally the neuralgia would yield to his treatment at once, and at other times the treatment would not have the slightest effect. He said the pain seemed to be something terrible, and he had been at her house night after night, and on one occasion three different times in the course of one night, the pain was so severe. He asked me if I thought the cause of it could be in any of her teeth. I told him I thought probably it was, from the symptoms. He desired me to see the lady. I told him that undoubtedly she had her own dentist, and I suggested that she go to her dentist and have her teeth examined. She went to her dentist, and he, supposing he must do something, extracted a first molar in the lower jaw, the only molar she had that occluded with any of the upper teeth. That operation gave no relief whatever. The cause of the trouble proved to be a bicuspid, an adjoining tooth, which had an exposed pulp and was suppurating under the filling. The pain was relieved just as readily and easily as in the other case I have mentioned. I think that these cases are serious in their aspects, both in the amount of pain the person has to suffer and the serious amount of nervous prostration that ensues, and it certainly taxes the patience and resources of the physician to find remedies for the relief of this intense suffering. I think dentists can do a great deal of good by informing physicians as to the cause of the trouble in these cases.

Dr. J. B. Rich. In obscure cases like those that have been described here this evening, the location of the trouble can be ascertained by passing a current of sensational electro-magnetism through the suspected tooth. This kind of electricity is best produced by Kidder's electro-magnetic apparatus. By the peculiar arrangement of the coils in the helix of this machine, ten different qualities of electricity can be produced. For the purpose of applying the elec-

tro-magnetic currents, I have constructed a simple and inexpensive electrode, that can be attached to a tooth with a firm grip. The following is a description of this little instrument: A piece of copper wire about seven inches long, and of the diameter of No. 30, Stubs's wire-gauge, is flattened for about a quarter of an inch at each end. With a round- or oval-faced punch, one side of each flattened end is countersunk, and beat out into the form of a cup, of about three-sixteenths of an inch in diameter; the straight wire is then so bent that it forms a loop in the shape of an egg, with the ends pressing forcibly together, and becomes a pair of spring tongs, with the cups on the inside of the shafts, like ordinary sugar tongs. The end of a flexible wire-rope conductor, three or four feet in length, is fastened with a turn around the loop that forms the spring of the tongs, so as to bring the metal surface of the conductor and the copper wire tongs in close contact. The conductor, and the whole of the surface of the tongs, except the inside of the cups, is then to be covered with silk or some other good non-conducting substance. In the hollows of the cups pieces of fine sponge are to be fastened with thread, and saturated with water while being used. The flexible conductor is attached to the negative electrode of the machine. The tooth to be tested is grasped by the ends of the shafts of the tongs, with the pieces of wet sponge in contact with its surface, while a conductor from the positive electrode is held in the hand.

When the electrode has been attached to the tooth apply a very feeble current of slightly sensational electricity, and the pain complained of will be located, if it is caused by inflammation of the pulp or periosteum.

A Member. Does it give pain when the suspected tooth is subjected to it?

Dr. Rich. The sensational currents of an electro-magnetic machine will produce pain, if the inflammation which caused the pain complained of still exists. Electricity should always be used with great caution, as there is the greatest conceivable difference in individuals as to their susceptibility to the effects of electric currents, some persons having a sensibility to electricity so exalted that only the most gentle procedure, and that with the most feeble currents, is at all admissible in their case.

Dr. Dodge. I would like to inquire what Dr. Rich means by sensational electricity.

Dr. Rich. The best of the electro-magnetic machines produce several kinds of currents, direct and induced. Some of these currents are not at all sensational. With most persons they may be passed through the system without being felt. These are called the soothing currents; their exhibition allays undue nervous excitement and re-

lieves pain. Most of the induced currents are sensational, but the sensations that some of them produce may not be painful, while others cause the most violent pain, but, as I have previously stated, the kind of sensation produced by the various sensational currents, will depend upon the degree of susceptibility to electricity of the individual to whom it is applied.

Dr. Dodge. Is there a different sensation when this electricity is applied to an exposed nerve from that which follows its application in cases of pericementitis?

Dr. Rich. Yes; there would be the same difference in the sensations as there would have been if the electric currents had not been applied. The electric currents only intensify the pain arising from either of the conditions stated, without altering its character. I form these conclusions by the descriptions given by patients. I do not know that they are absolutely correct, as it is very difficult to get patients to describe their sensations accurately. If a dentist, under the same circumstances, were to submit to the application of these currents, he could give an accurate and intelligent description of the sensations they produce.

Dr. M. L. Rhein. As to the varying effects of electricity being produced by different degrees of electrical intensity, I think these differences may be due as much to volume of current as to its intensity. Increasing the amount of the current does not necessarily increase its intensity. A small wire may carry a more intense current than is being sent along a larger wire carrying a greater volume.

Dr. Dexter. I must object to considering electricity as progressing like a "stream" or "current." Electricity is not a tangible material, and therefore cannot be properly considered as progressing in the manner of a liquid or semi-solid in motion. I am aware that older theories and long usage have so established the word "current" in this relation that, although meaningless and even harmful terminology, it cannot now be changed. But all scientists, while using it, are well aware of its defects. They know that electricity progresses by vibrations, in the same manner as light, heat, sound, and other modes of motion. A row of ivory balls set in contact with each other will illustrate this; the first one being struck, the force used causes vibrations through the row until the last is reached, which flies off. In other words, the molecules making up the balls tend to move upon and from each other, in the direction of the impetus received; and the last ball, being unattached to its companions, is separated from the row. Molecular attraction being stronger than ordinary electrical impulses, a wire carrying electricity is not disrupted; but that the law is still there and in force is proved by the fact that the wire is lengthened by the molecular movement induced,

just as the row of balls is lengthened by the distance to which the moved ball is driven. Should the electrical impulse exceed the molecular attraction, the wire will be disrupted, as the row of balls was disrupted by separation of its molecules. There is but one kind of electricity. This agent may be produced in various ways, and may effect many different results; but it, like light, heat, sound, is only a mode of motion; and there is nothing more mysterious about it than there is about light, heat, or sound. It is true we do not know all there is to be known about electricity, but neither do we know all there is to be known about light, heat, and sound. All these may be produced by various methods, and are capable of action in many different ways. Thus, heat, when gentle, will stimulate and invigorate, but when excessive, will destroy. A gentle electrical impulse may be soothing, or even imperceptible, while a stronger one may cause pain, or even death. But the general and fundamental laws of electricity are as well understood and as distinctly formulated as those of heat, chemism, or any other of the natural forces known to science.

Dr. Bogue. Mr. President, Dr. Dodge remarked that curative measures were, perhaps, of not so much importance as preventive. This recalls a discussion that arose when Mr. Tomes was in this country, as to whether tartar produced the loosening of the teeth, of which Dr. Dodge spoke, or whether it was merely an accident of the disease, to use his words. Since that time we have had various theories presented to us, some holding that the tartar produced the loosening, and that solution of the tartar took place after its first deposition, which would account for the teeth occasionally being found loose, yet without any tartar upon them. The bacteria and leptothrix theory is being ventilated to some extent. But I fancy that we may learn from the most empirical and the least trained, if we will but take their facts. Indeed, all our science consists of learned and applied facts. In searching for the facts relative to loosening of the teeth, I have been unable to find any instance in which teeth well brushed and well used, as Dr. Atkinson put it, have loosened or come out. I had occasion, a few years since, to examine a little over five hundred skulls, the whole collection at Cambridge, and also the collection at the Academy of Sciences in Philadelphia. Those skulls, as you all know, I suppose, are skulls of some antiquity, and not one of them had large deposits of tartar upon the teeth. A great many had a line of tartar where the margin of the gum should have been, but none had large accumulations of it. Neither did I find any extensive roughness at the ends of the roots, except where I saw traces of an abscess. Since Mr. Tomes was here I have seen no teeth that were thoroughly brushed

and cleansed, clear to the margins of the gums, that have come out through loosening. I will repeat now what I said more than a dozen years ago, when I had a little controversy with Dr. Latimer on the subject of brushing teeth, that during the time I have been practicing my profession I have carefully inculcated the habit of thorough brushing, and I have no cases of loosening of teeth in my own practice among those who have been with me for many years and who follow directions. My father lost his teeth from deposition of tartar, and the tendency is just as marked in my case, perhaps, as in his, yet I have no fear of losing my teeth from that cause. I will repeat a statement made before this society a few years since, in regard to a family in which the mother lost all her teeth from tartar, and the father died from an operation for stone, and the tendency is most distinctly marked in every member of the family, and yet the effects have been completely cut short in all the younger members of the family, and checked in the older members by means of thorough cleansing and the persistent use of the brush. I think, without going deeply into the question, that practical answer comes to Dr. Dodge's question. I say what I do with some diffidence, but unless we repeat our experiences and failures we shall not progress. I saw a patient lately, twenty-six or twenty-seven years of age, I think, who told me she had always been in the care of a dentist. Her incisors, both above and below, were all loose, and the lower incisors must, I believe, be lost, and that very speedily. I took occasion to ask her if she had had her teeth cleansed. "Oh! yes, very frequently, two or three times a year," she said. "How was that cleansing done?" I asked. "Why, with instruments; the dentist went all around and cleaned them." "Did you ever have more than one sitting to accomplish that cleaning?" "Oh! no, never," was the reply. Now, it seems to me impossible to thoroughly cleanse a set of teeth at one sitting. The blood, which must necessarily flow, renders obscure that which we wish to remove. There is another feature of the matter to which I think we give too little thought, and that is the fact that during the operation our hands and our attention flag by concentration for a length of time, and we need some rest as well as the patient; and I find myself unable, without two or three or more sittings, to thoroughly cleanse a set of teeth that are incrusted with tartar. But when that cleansing has been accomplished, and when the gums have been once more shrunk down to the teeth with I do not much care what tonic or astringent, it is the patient's business to thoroughly use the brush, and to give the gums sufficient exercise to keep them in healthy condition. When so treated I find that loosening is checked, and quite a number whose teeth have been given up as useless, have

retained them after this sort of treatment for periods varying from eight to twelve years. To say that the cases are cured would be saying too much, but that their condition has been much improved and the suffering decidedly palliated, is quite true.

Dr. Dodge. What does Dr. Bogue mean by exercising the gums?

Dr. Bogue. If Dr. Dodge will permit me, I will tell him what I sometimes tell my patients in the chair, when they ask, "why do we lose our teeth so early when wild animals and dogs do not?" I say, if you were a savage in the woods and had to hunt for your dinner you would get a good bit of exercise before you got the game; you would have to catch your hare before you cooked it; and when you had caught it and brought it in, you would sit down before the fire and, perhaps, roast it a little on a stick, and then you would gnaw the flesh from the bones, and eating in that way would give your teeth and gums an amount of exercise that they do not now get. And the roots used by savages still further contribute to the friction and exercise that is necessary to keep the gums and teeth in a healthy condition. But, unlike the savage, you call upon others to hunt the game, and then you pass the hare over to a French cook, who has it fricasseed, perhaps, and when it is placed upon the table you must cut it up fine enough so that you can eat it with a spoon or fork, all of which obstructs the use which nature designed the teeth should have; and the only way to compensate for that loss of natural exercise is to give the gums and teeth, with a brush, exercise of another kind. I think that both brushing and mastication aim at the same end.

Dr. Dodge You look upon the brushing of the teeth as something more than a cleansing process?

Dr. Bogue. Most decidedly I do.

A member. Why would not chewing gum be of value?

Dr. Bogue. I think it would, measurably. When I have been asked about chewing tobacco, I have had to say that I knew nothing against it except the grit.

Dr Crandall. Would Dr. Bogue recommend a stiff, harsh brush for the general use of the average patient?

Dr. Bogue. I should think the question carries with it its answer. I would recommend a brush sufficiently stiff to thoroughly cleanse the teeth and gums, but not sufficiently harsh to tear the gums. And a further recommendation is the procuring of a dozen brushes at a time, so that when one gets soft from use it can be thrown aside and another taken from the box without going to the drug store to buy it.

Dr. John B. Rich. It is undoubtedly true that the civilized man of the present day has a different mode of preparing his food from that

practiced by man in an entirely uncivilized state. It is also probable that the savage had strong, finely-formed teeth, and powerful jaws. I do not know that he kept his teeth clean by tearing his food with them into manageable mouthfuls. If he did I would not like to see anybody go back to the condition and habits of the savage, merely for the sake of having the kind of teeth he had, or the pleasure of cleaning them in the manner attributed to him. To preserve the teeth it is very important that they should be kept perfectly clean. Brushing will not always cleanse them thoroughly, because all the parts of every tooth cannot in many cases be reached with a brush, although it may be of the most convenient shape and size. Then, again, many persons whose teeth could easily be kept clean with a brush do not use it in a manner to accomplish that result, simply because they do not know how. They rub the brush across the teeth, so that the bristles only touch the front surfaces, and do not touch the surfaces of the interstices.

I always take great pains to instruct my patients how to clean their teeth. I direct them to use the brush with a rotary motion, describing with it small circles from the cutting edge down to the gums. By this motion of the brush, the bristles will penetrate the interstices between the teeth, and touch every part of their surfaces, except at the points where they are in immediate contact. I also direct them to never use a large or a stiff brush, but to use one of the following description: A small, soft brush, composed of not more than four rows of bristles, each row an inch and a half long; the brush to taper towards its point, from half an inch at the commencement of the rows to a quarter of an inch at its end; the bristles to also decrease in length, from half an inch at the commencement of the rows to a quarter of an inch at the end of the brush. I am particular about the form, size, and texture of the brush, and the one I have just described is the result of many experiments, and combines all the good elements that are desirable in a brush to make it efficient in cleaning the teeth. I also teach my patients how to shape and use the soft wood sticks (sandal-wood, cotton-wood, or cedar), so that by their use they can clean every part of the dental arch that cannot be effectually reached with the brush. The best mechanical agent for cleansing and polishing the teeth is rotten stone.

With floss-silk to clean the approximal surfaces, those who have been taught to properly use the appliances I have named should under ordinary circumstances be able to keep their teeth clean, particularly if they are made to understand that they must use their eyes in doing so, the same as they would if they were cleaning their nails. Now, although all of this information is often-

times thrown away upon our patients, as many of them will not try to keep their teeth clean, no matter how earnestly we may endeavor to impress upon them the importance of their doing so, still we will not perform our whole duty unless we cause our patients to be thoroughly instructed in all the details of this most important duty to themselves. If possible, we ought to examine and, if they need it, clean the teeth of our patients every six months, for no matter how anxious they may be to do their whole duty, there are many cases where only the skillful hands of the dentist can reach all the surfaces of the teeth and insure their being perfectly clean.

The society then adjourned.

E. T. Payne, *Secretary.*

GEORGIA STATE DENTAL SOCIETY.

The fifteenth annual meeting of the Georgia State Dental Society was held in the old City Hall, Atlanta, commencing Monday, July 30, 1883.

The following officers were elected for the coming year: George H. Winkler, Augusta, president; A. G. Bouton, Savannah, first vice-president; J. A. Tigner, Rome, second vice-president; L. D. Carpenter, Atlanta, corresponding secretary; G. W. H. Whitaker, Sandersville, recording secretary; H. A. Lowrance, Athens, treasurer; J. H. Coyle, L. D. Carpenter, G. W. McElhaney, S. B. Barfield, R. B. Adair, executive committee.

Adjourned to meet in Atlanta, the second Tuesday in May, 1884.

G. W. H. Whitaker, *Recording Secretary,*
Sandersville, Ga.

PENNSYLVANIA STATE DENTAL SOCIETY.

The fifteenth annual session of the Pennsylvania State Dental Society was held at Cresson, commencing Tuesday, July 31, 1883.

The following were elected officers for the ensuing year: S. H. Guilford, Philadelphia, president; Geo. Elliott, Meadville, first vice-president; James Truman, Philadelphia, second vice-president; W. H. Fundenberg, Pittsburgh, corresponding secretary; E. P. Kremer, Lebanon, recording secretary; W. B. Miller, Altoona, assistant recording secretary; G. W. Klump, Williamsport, treasurer; W. E. Magill, Erie, and H. Gerhart, Lewisburg, members of the State board of dental examiners.

The next meeting will be held at Wilkesbarre, commencing the last Tuesday in July, 1884.

EAST TENNESSEE DENTAL ASSOCIATION.

THE seventeenth annual meeting of the East Tennessee Dental Association convened at Rogersville, Tuesday, August 14, 1883, Dr. H. W. Morgan, presiding.

The following officers were elected for the ensuing year: R. A. B. Moyers, president; F. A. Shotwell, vice-president; S. M. Prothro, secretary and treasurer; S. B. Cook, corresponding secretary.

Adjourned to meet at Chattanooga, Tuesday, August 26, 1884.

CENTRAL ILLINOIS DENTAL SOCIETY.

THE Central Illinois Dental Society will hold its second annual meeting at El Paso, Ill., Tuesday, October 9, 1883.

Papers will be read on "Pre-Natal Influences as affecting the Teeth," by George H. Cushing; "Bacteria," by E. D. Swain; "Alveolitis," by A. W. Harlan; "Dentistry and its Present Status," by K. B. Davis; "Theories," by W. A. Johnson; "Filling Root-Canals," by C. W. Spaulding, and "The Higher Education," by J. D. Moody.

The meetings will be held in the City Hall, and continue three days. Hotel rates, $1.50 per day, at the Campbell House.

C. R. TAYLOR, *Secretary.*
Streator, Ill.

EDITORIAL.

PENNSYLVANIA DENTAL LAW.

THE following is the form of affidavit adopted by the State examining board to be used under the new law requiring all Dentists to register in the recorder's office, with a view to uniformity, as nearly as possible throughout the Commonwealth:

STATE OF PENNSYLVANIA, } *ss.*
County of }

Personally appeared before me who being duly sworn according to law deposes and says that he now resides in the of county of ; that he has been in continuous practice of dentistry in this Commonwealth for the full term of years last past, as follows: In the of and county of from the month of 18 to the month of 18 , and in the of and county of from the month of 18 to the month of 18 ; and that said term of years is exclusive of the usual period of pupilage or study under instruction.

DEPONENT FURTHER STATES that he makes this statement for record in compliance with the Supplement to the Act of the General Assembly of Pennsylvania passed April 17, A.D., 1876, for the Registration of Dentists, etc.

Sworn and subscribed before me }
this *day of* 188 }

MICHIGAN DENTAL ACT.

In accordance with the provisions of the law to regulate the practice of dentistry in the State of Michigan, the Governor of that State has appointed the following members of the State board of examiners: A. T. Metcalf, Kalamazoo; J. A. Robinson, Jackson, and G. R. Thomas, Detroit; who by virtue of the terms of their appointment become respectively, president, treasurer, and secretary of the board. The law goes into effect September 9, at which time the board will organize. Dentists in actual practice in the State have ninety days from that date in which to register in accordance with the terms of the act.

CORRECTION.

By an inadvertence of the reporter, a portion of the title of Dr. Hodson's paper, which appeared in our August number, was omitted. The title of the paper should have been "Watts's Crystal Gold."

BIBLIOGRAPHICAL.

Proceedings of the Missouri State Dental Association, 1865 to 1882. St. Louis, Mo.: Continental Printing Co.

In this pamphlet of 160 pages are embodied the minutes and proceedings of the Missouri State Dental Association from its organization in 1865 to the present time, "compiled from the written records of the association, by Dr. W. H. Eames, recording secretary." Several of the annual addresses and papers are appended, as also the constitution and by-laws of the association and a code of dental ethics. It contains the usual lists of officers, standing committees, and active and honorary members. It makes a substantial pamphlet, and is well printed.

The Essentials of Pathology. By D. Tod Gilliam, M.D. Philadelphia: P. Blakiston, Son & Co., 1883. Price, cloth $2.00.

The author of this volume thus expresses his purpose in its preparation. "The object of this little book is to unfold to the beginner the fundamentals of pathology in a plain, practical way, and by bringing them within easy comprehension, to increase his interest in the study of the subject. It is not, therefore, intended to supplant more pretentious works by allaying, but rather to lead up to them by kindling, a thirst for pathological investigation." He has made an earnest and intelligent effort to redeem the promise of the preface, resulting in a compact and fairly comprehensive résumé of the subjects indicated by the title.

A Compend of Materia Medica and Therapeutics, with especial reference to the Physiological Actions of Drugs. For the use of Medical, Dental, and Pharmaceutical Students and Practitioners. By Samuel O. L. Potter, M.A., M.D. Philadelphia: P. Blakiston, Son & Co., 1883. Price, cloth, $1.00.

A Compend of Chemistry, with Table of Elements. By G. Mason Ward, M.D. Philadelphia: P. Blakiston, Son & Co., 1883. Price, cloth, $1.00.

A Compend of Visceral Anatomy, especially adapted to the use of Medical Students, with forty-one illustrations. By Samuel O. L. Potter, M.A., M.D. Philadelphia: P. Blakiston, Son & Co., 1883. Price, cloth, $1.00.

The above three volumes belong to the series of "Quiz Compends," the first four of which have been already noticed in these pages. These are good books of their class; well arranged and well condensed; the essentials of each subject appearing to have been kept well in view. If made to take the place of the larger, more comprehensive, and more thorough text-books, they will unquestionably prove a curse to the student; but if employed as intended, their arrangement and brevity make them convenient as reminders in preparing for examination, or to the medical practitioner to freshen memory on details liable to be forgotten.

OBITUARY.

Dr. THOMAS FRY.

Died, in Brooklyn, New York, August 4, 1883, of enlargement of the liver, Dr. Thomas Fry, in the fifty-fourth year of his age.

Dr. Fry was born in Wellington, England, and came to America thirty-six years ago. He settled in Brooklyn, and applied himself to the study of dentistry, beginning its practice in 1849, and gradually earning an enviable reputation in the profession as a fine operator, doing skillful and conscientious work. He possessed considerable inventive talent, which is attested by dental instruments now in use. He was a student, and a man of extended reading and intelligence, and was considered as an excellent representative of "self-made men." He was a member of the Brooklyn Dental Society, of the Second District Dental Society of New York, of the Long Island Historical Society, and was a prominent Mason.

Dr. Fry was esteemed a worthy citizen, who lived a pure and blameless life, being honest and straightforward in his intercourse with his fellow-men.

DR. W. A. CANDEE.

Died, at Bristol, Conn., July 26, 1883, of heart disease, Dr. W. A. Candee, in the fifty-ninth year of his age.

Dr. Candee was born at Oxford, Conn., in 1825. He was a competent dentist, being well known in the community in which he resided, having been in actual practice for about forty years. He was for several years in partnership with Dr. F. L. Wright. Many successful students testify to his efficiency as an instructor.

FREDRICK A. REINHART, D.D.S.

Died, in London, England, Monday, August 6, 1883, Fredrick A. Reinhart, D.D.S., in the twenty-ninth year of his age.

Dr. Reinhart was born at Ehrenstetten, Grand Duchy of Baden, Germany, in 1854. He graduated at the High School of Stauffen; entered the banking house of Krebs & Co., and shortly after came to America, where he commenced the study of dentistry, with his father, at Pittsburg, Pa. He graduated at the Philadelphia Dental College, class of 1876, and practiced in Pittsburg, until July, when he went abroad in hopes of regaining health. At the time of his death he was President of the Pittsburg Dental Association, and a member of the Pennsylvania State Dental Society.

HINTS AND QUERIES.

The Cap Plate.—This appliance (see Dental Cosmos for July, 1883, page 344) is not new in England. I have myself seen plates of this kind made at least twenty-five years ago, and condemned them, because after one or two years' use the teeth which were covered gradually became black and comparatively soft, notwithstanding every care in keeping both teeth and plate clean. I have seen several cases, and not one of these was permanently satisfactory, owing to the rapid deterioration of perfectly sound teeth which were covered. Possibly Dr. Dexter has had no *long* experience with these plates; if he has not, the results of two or three years' wearing would no doubt be of interest. In my own case the system was permanently and totally condemned as a serious injury to every mouth in which the plates had been used.—Thos. Fletcher, *Warrington*, *England*.

To the Editor of the Dental Cosmos:

Sir:—In your August number, page 446, Dr. Levett very kindly corrects what he pronounces a bit of misinformation that appeared in my letter to the New York Odontological Society.

Dr. Levett would naturally know better than I the details concerning the foundation of the Paris dental college, but his explanation will not detract from the compliment that I intended to pay to the gentlemen who, in face of the obstacles mentioned by him, had the courage, energy, and perseverance to establish an institution that must command the respect and good-will of all those who know about it, and who are familiar with similar institutions here and elsewhere.

August 4, 1883. E. A. Bogue.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

ON THE ACTION OF ARSENIOUS ACID UPON DENTINAL AND PULP TISSUE.

BY C. F. W. BÖDECKER, D.D.S., M.D.S., NEW YORK.

Read before the American Dental Association, at Niagara Falls, August 8, 1883.

THE action of arsenious acid upon the dental tissues has for a long time been a disputed question, and the changes effected by the poison when applied to the cavity of a tooth were thought to be confined to the pulp-tissue; although Dr. Clowes, of New York City, showed, several years ago, that an application of arsenious acid to the dentine of a tooth far from the pulp, would lead to the same result as if the agent was placed directly upon the organ, the only difference being that its action in the former instance was not so rapid.

In 1879, Dr. A. Witzel, of Germany, published an extensive work on the diseases of the dental pulp. In this he claims that a pulp, if not too much inflamed, can be treated with arsenious acid, its coronal portion amputated, and the remaining pulp-stump preserved. This doctrine has created a great deal of controversy in this country, although in Germany it seems to have been almost universally accepted. I have followed this line of treatment in sixteen cases, in an experimental way, selecting teeth which I was able to examine from time to time. I should not have used this method in so many cases, had not the first experiment misled me in such a manner that at the present time I am unable to explain it.

The case was as follows: in November, 1879, a healthy young lady, over eleven years of age, presented herself for the correction of an irregularity. The front teeth of both the upper and lower jaws were overlapping each other, and although the arches were pretty well developed there was not room enough for thirty-two teeth. I, therefore, decided to remove the sixth-year molars as soon as the

second molars began to make their appearance. Three of the sixth-year molars were well preserved, but the left lower one was largely decayed, and gave the patient trouble whenever anything sweet or sour entered the cavity; but the pain ceased as soon as the irritant was removed. Pressure in the vicinity of the pulp-chamber produced no pain. All these were signs that the pulp was in a tolerably healthy condition and admirably adapted to an experiment with arsenious acid in the manner described by Witzel. The details of the operation, concisely stated, are as follows: After the cavity has been cleaned of decay, the pulp is exposed and an application of

℞.—Acid. carbolic, 1.50 gms.
Tinct. aconiti rad., } *āā*, 0.50 gms.
Aquæ menth. pip., }
Glycerinæ, 0.20 gms.
Acid. tannic., 0.30 gms.
Ol. menth. pip.,
Ol. caryophylli, *āā*, gtt. xxv.—M.

is made for about five minutes, the arsenious acid paste is laid directly upon the pulp, and the cavity is hermetically sealed. After twenty-four hours the temporary plug is removed, a sharp, new bur which has been disinfected is put into the engine, and with a few quick revolutions of the bur the coronal portion of the pulp is amputated. The pulp-chamber is then syringed with a five per cent. solution of carbolic acid in water until the bleeding has ceased, when the cavity is dried, the pulp-stumps touched with the carbolic acid and tannin solution mentioned above, then with a carbolized solution of mastic, and still after this with a pulp varnish composed of collodion, gutta-percha, and a little carbolic acid. The pulp-stumps are then capped with carbolic acid cement, the formula of which is as follows:

℞.—Acid. carbolic., 0.50 gms.
Alcohol. absolut., 0.20 gms.
Aquæ destillatæ, 4.00 gms.
Glycerinæ, 2.00 gms.—M.

To this add an equal volume of the zinc chloride used in oxychloride fillings; and to a sufficient quantity of this mixture add oxide of zinc, and mix to the consistence of thick cream.

Six months after the operation I saw the patient and removed the four teeth mentioned above. On opening the roots of the left lower molar, to my surprise, I found the amputated pulp-stumps alive. Without delay they were prepared for the microscope and examined. The nerve-fibers of both these specimens showed nothing abnormal; the connective tissue of the pulp had retained its myxomatous char-

acter, and no sign of a former inflammatory process was observable, except where the pulp had been cut in the amputation.

This result induced me to try the same procedure in fifteen other cases, although microscopical examination of pulps treated with arsenious acid and extirpated with the broach had given evidence of the destruction of the medullated nerve-fibers, as far down as the apical portion of the pulp. These pulps, however, without exception, had been removed on account of pulpitis, and I was, therefore, unable to determine whether the degeneration of the nerve-fibers was the result of the application of arsenious acid, or of a preceding inflammatory process.

The results obtained from the other experiments I made with Witzel's method of amputation, were, however, not so encouraging as in the case mentioned above. I have seen eleven of the remaining fifteen cases experimented upon since last October, but the pulp-stumps in every one of them had died, although the external appearance of the teeth was perfect.

The above-mentioned facts make it evident, therefore, that the minute microscopical examination of the changes effected by arsenious acid is to us of the greatest importance. They can best be studied in healthy or superficially decayed teeth of human subjects, or in the teeth of such animals as can be easily experimented upon. In all cases, therefore, a mode of procedure must be chosen, and the line of study is necessarily experimental, and should extend over a long period of time, calling for no inconsiderable amount of labor and painstaking care. Let this, therefore, be my excuse for communicating only a portion of the results obtained, which I shall take care to enlarge and detail at the earliest time. From my opening remarks and your own experience, you will know how important, practically, is any knowledge upon this subject. I have no hesitation, therefore, in laying before you this fragmentary communication.

The arsenious acid preparation which I have used exclusively is the well known one composed of one part of arsenious acid, and one part of sulphate of morphia, made into a paste with chemically pure carbolic acid, which was put into a drill-hole in the tooth and covered with a temporary stopping, such as cotton saturated with sandarac varnish, etc. I will not enter into details, but will only mention that, bearing in mind the results I wished to obtain, I drilled in the direction of the pulp-chamber, but did not in any case perforate it. It appeared to be quite immaterial, however, how thick was the interposing dentine in respect to the changes caused by the poison.

I used human teeth and those of rabbits. They were extracted in from three to six days after the arsenious acid was applied. The

teeth were opened immediately after extraction and immersed without delay in the proper reagent. It is very important to proceed in such manner that the pulp shall not be torn or dislodged, and yet may be acted upon by the fluids while still lodged in its natural position. When the elements of the pulp are once sufficiently fixed then only is it possible to cut (or tease) it without causing a great number of artificial changes. This is the first rule, I may say, which must be strictly adhered to by the student of so delicate an object as is the pulp. This is no easy matter, for unluckily the hardening fluids most generally in use themselves cause considerable changes; even water, and as has been found, the tissue fluid itself, if allowed to act a sufficient time after death gives to the medullated nerve-fibers an appearance which I have no doubt has frequently been described as pathological. Should I enter here upon the difficult task of describing the action of reagents, I would take up too much of your valuable time, and I am sure, furthermore, that I would tell many of you what you have known before. I will, therefore, say that after having used different other reagents, I have come to the conclusion that the very best results can be obtained by immersing the tooth in the manner described in a one per cent. solution of hyperosmic acid for from ten to twenty hours, according to the density of the tooth. As regards the pulp, this will be found to be sufficiently hardened after a sojourn of two to three hours in the same fluid; it can then be easily removed from the pulp-chamber without fear of serious harm. Both parts are then placed in distilled water and preserved in alcohol. I have, however, invariably examined the pulp, teasing it with great care as soon as washed, after sufficient hardening in hyperosmic acid. The changes here are truly remarkable: Firstly, if the poison has acted sufficiently long, the whole of the pulp shows to the naked eye, as soon as exposed, all the signs of active inflammation.

I shall not enter into details of the appearance which such pulps present, but shall confine myself to a description of the alterations found in the medullated nerve-fibers. According to the degrees of inflammation resultant from the irritation which the arsenious acid undoubtedly does produce, a greater or less number of nerve-fibers are changed in appearance in such manner that their myelin is separated into larger and smaller masses, between which I have not been able as yet to distinguish either an axis cylinder or an intermediate substance. I may, however, mention that I have seen in nerve-fibers which have remained under the influence of the arsenious acid for six days a granular substance which can be colored by rose aniline. When the poison has acted for the last-mentioned period all vestiges of myelin have disappeared and in their stead are found smaller and

larger globules, which are stained a deep black by hyperosmic acid. I will not venture to advance an opinion as to the nature of these bodies. Thus much, I dare say, however: they are certainly a product of the disintegration of the myeline sheath. I have no doubt that this is a stage in the complete destruction of the nerve-fibers, and I may mention in this connection that, in one instance, I have found similar globules free in tissue surrounding a number of degenerated nerve-fibers in an incisor of a rabbit after three days' reaction of the arsenious acid.

You will no doubt agree with me that even this is far from complete, but you will at the same time be forcibly reminded of similar results found by many histologists after section of peripheral nerves in other parts of the body.

What will be the result of the arsenic so applied, not alone to the pulp itself, but as regards the nutrition and life of the whole tooth, is easily surmised, and can be demonstrated clearly by an examination of the dentine.

After having treated the newly extracted tooth with hyperosmic acid, and thereby guarded against artificial changes, I prepared ground specimens of the same. These were then stained with picro-carmine and suitably treated for mounting in Canada balsam. I purposely abstained from decalcifying these specimens, for, unless this process is watched with great care, the result in most cases will be, to say the least, very problematical. I have found that for the closer study of the dentinal canaliculi and their contents—the Tomes fibers—all decalcifying agents are out of place.

A superficial view of such specimens shows that hyperosmic acid has been reduced in certain places, whereas others appear colorless. Let me say at once that the former are regions of pathological changes. They start either directly from the place of contact with the arsenious acid, and extend varying distances into the dentine, according to the time of the reaction; or, as is evident where they can be traced as far as the pulp, they radiate apparently from the latter and grow toward the periphery. Viewed under the microscope the dentinal canaliculi are very much enlarged, more so at one place than at another, and they appear to be filled with a mass deeply stained in black. The same can be said of the transverse connections of the canaliculi. When, however, high powers (one-tenth of an inch immersion of Grunow, N. Y.) are brought to bear on such places, the black mass is found to be composed of irregularily-shaped bodies, which I doubt not are remnants of the dentinal fiber. For, in following up such canaliculi, it can be distinctly seen that the greatly swollen dentine-fibers are broken up more and more as one approaches the seat of the greatest destruction. As a

consequence, the basis-substance is very much narrowed in extent as the canaliculi gain in diameter. Moreover, it appears that the lime-salts are dissolved. I incline to this view because of the peculiarity of coloring, a matter into which I deem it advisable not to enter more fully just at present. I may add that, in such places, when the canaliculi are in transverse view, all these conclusions are fully borne out.

So far do I feel justified in entering upon this important subject to-day, although there are many points which I have thought best to lay over or only to touch upon. I am well aware, and should be prepared to hear, that the microscopical changes in the dentine are similar to those found in dental caries. It is well that in dental pathology, as well as in general pathology, due reference should always be made to the clinical aspect of the disease, and it is not less than presumption to classify together pathological units, with our present methods of investigation, enormous as has been the progress in this direction in late years. I am, therefore, far from identifying the changes here under consideration with those found in dental caries.

I am also aware that in very many cases, apparently, the effect of arsenious acid has not been so bad as might be expected, but on the other hand, you may all remember severe cases of local or even constitutional disturbances which could not be traced to any other cause than a dead tooth which had been treated with arsenious acid. Be this as it may, the question is certainly in order, whether, in view of the serious consequences, we are any longer justified in destroying pulps by the use of arsenious acid, and the answer must be that the risk is too great for the gain.

IODOFORM IN DENTISTRY.

BY JAMES TRUMAN, D.D.S., PHILADELPHIA.

Read before the Pennsylvania State Dental Society, July, 1883.

THE attention which has been given this subject abroad, especially in Germany, during the two past years, would seem to require a corresponding effort on our part to arrive at definite conclusions in regard to the therapeutic value of this drug; but up to this time it has received but little notice. In hope of arousing some interest in it the writer proposes to briefly review the opinions of some of the most prominent writers in our profession in Germany, with such additional remarks as may seem pertinent to the subject.

Iodoform, as you are all doubtless aware, comes to us in yellow crystals, having a peculiar, persistent saffron odor. It is insoluble in water, but is soluble in ether and the fixed oils. It has for a considerable period been made use of in surgery in "sloughing and ill-

conditioned wounds, irritable ulcers, rodent ulcers, chancroid, sloughing phagedena, and serpiginous syphilitic ulcers. * * * Syphilitic ulcers of the tonsils, pharynx, and tongue are most effectually treated by local and direct application of powdered iodoform. * * * Fissures of the anus, hemorrhoids, and ulcers of the rectum are improved and the pain which attends them relieved. * * * The pain of cancer may be somewhat relieved, and the fetid odor which attends the discharges may be removed by the application of iodoform to the surface" (Bartholow).

It will thus be observed that we have two characteristics in this drug of peculiar value to us as dentists in the treatment of certain pathological conditions,—the antiseptic and anesthetic qualities. While it holds these with some other antiseptics, it has another in common with iodine, bromine, and chlorine, which will be alluded to hereafter in the quotation from the valuable paper of Prof. Litch.

Dr. Julius Scheff, Jr., a teacher in the University of Vienna and a dentist of that city, published a paper in the *Vierteljahrsschrift für Zahnheilkunde*, in 1881, in which he remarks, in substance, that in many cases iodoform is apparently a wonderfully efficient remedy that we have previously failed to recognize and introduce. As his experiments were among the first, if not the first, in dental practice, it may not be uninteresting to follow him through some of his difficulties. He says, "I brought iodoform first in combination with vaselin, but this gave me a salve of such a consistence that I could not introduce it, and I was, therefore, obliged to abandon it. A second preparation in the form of a paste had more satisfactory results, yet the consistence was not sufficient to rival arsenical paste." At last, after much experimenting, a paste was obtained by Dr. Paschkis after the following formula:

℞.—Iodoformi pulv., } *āā* 4.00 gms.
Kaolin, }
Acid. carbol. cryst., 0.50 gms.
Glycerinæ, q.s.
Ad. ol. menth. pip., gtt. x.—M.

This paste possesses the necessary consistence to be handled with instruments, while the the carbolic acid and oil of peppermint overcome the greater part of the odor. In this first article he entertains the idea that iodoform will entirely supplant arsenic in the treatment of pulps. This conclusion, it is hardly necessary to say, was not confirmed by later investigations by himself and others.

Hagelberg, of Berlin, "*Vierteljahrsschrift f. Z.*," 1882, uses a thick syrup of colophonium in carbolic acid in the treatment of exposed pulp. He bathes the sensitive portion with this syrup until pain

ceases, then adds iodoform and temporarily fills with gutta-percha. When it is difficult to apply it in the form of powder he makes use of an ethereal solution applied with a syringe. The ether speedily evaporates, leaving the iodoform deposited. From the 8th of November until the 8th of March he had treated eighty-three cases: with temporary stoppings of gutta-percha, sixty-one; in fifteen cases he made use of cement, and in seven amalgam. Twenty of these had been for varying periods under arsenical treatment. Sixty-three had been previously treated with solution of carbol-colophonium; the greater part of these sixty-three cases were filled at the first sitting. Of the whole number of eighty-three cases, six were failures; one of these was filled with phosphate of zinc and the other five with gutta-percha. In all cases of exposure he now makes use of iodoform, having entirely abandoned the use of arsenic. In regard to the mode adopted and recommended by Dr. Scheff, he remarks: "While Dr. S. uses a paste of iodoform and kaolin in combination with glycerin and carbolic acid, I prefer clear iodoform, as I conceive that the effect of the latter is greatly weakened by the kaolin envelope. Further, it is questionable whether the glycerin does not disturb the antiseptic operation of the iodoform."

In the proceedings of the Austrian Society of Dentists for 1880-'81, a discussion on this subject is reported, in which Dr. Witzinger stated that he had treated nineteen cases, with two failures. The oldest of these cases was nine months, and the rest from two to five months.

Dr. Robicsek had not had good results in a single case. Periosteal inflammation followed the introduction of iodoform.

Dr. Scheff by further investigation had noticed a difference between acute and chronic pulpitis in the action of this remedy. In the acute, the result was satisfactory in six cases, in two it was necessary to remove the filling. He had twenty cases of chronic pulpitis, with good results in all of them."

At the yearly convention of the Central Society of German dentists, held in Breslau, August 7, 1882, reports on iodoform were received from Dr. Witzel, of Essen, and Skogsborg, of Stockholm, to whom the subject had been referred for careful investigation.

Dr. Witzel's report was very lengthy, and included many collateral subjects bearing on pulp-treatment. He recommended a ten per cent. ethereal solution of iodoform for exposed pulps, also in connection with salicylic acid and morphia as a paste for exposed and amputated pulps, and an iodoform cement paste for filling root-canals. He suggests covering the paste with metal caps to prevent pressure. He does not advise any attempt to restore the pulp to a healthy state

by means of iodoform. He repeats the advice he has given for the past eight years, to cauterize inflamed pulps with arsenic, remove them, and fill with cement. The iodoform cement paste he regards as the best material for filling roots.

Skogsborg in his report said that "in a tooth with a pulp partly or fully inflamed, whereby acute periostitis follows, remarkable results had been produced with iodoform after the canal had been thoroughly cleansed." He recommended iodoform in preference to arsenic in pulpitis. He had arrived at the opinion, after treating from four to five hundred cases, that arsenic could be dispensed with. "With my iodoform paste," he says, "the severest pain is removed, if care is taken not to press the paste on the pulp." * * * His patients had not complained of headache, so often described as an accompaniment of the treatment by this drug, although he had frequently treated several teeth in the same mouth. The taste is, however, very disagreeable. He gives his mode of preparing the paste, which I transcribe in full: "The iodoform is first dissolved in ether in the proportion of 15 to 100, *e.g.*, 150 grams of iodoform to 900 to 1000 grams of ether. Iodoform in its usual form of yellow crystals can be exposed to the light without danger of change, but the preparation is kept best in a dark glass bottle. This solution is poured upon 250 grams of infusorial earth. The mixture must be rubbed in a mortar for a time sufficient to evaporate the ether. When the mass is weighed it will be found that instead of 400 grams it has increased to 500. While the powder is apparently dry more than twenty per cent. of ether is combined with it, and this must be evaporated by allowing it to stand twelve hours. Then add upwards of 500 grams of vaselin, and the mass is then worked until it is reduced to a paste. Add 10 grams or 200 gtt. of ol. menth. pip.

"I must here remark," he adds, "that the breathing of iodoform fumes is not injurious, as asserted. I have inhaled the evaporations of iodoform and iodoform ether for many hours, during the mixing of large quantities, and have experienced no dizziness. Several young persons engaged in rubbing and evaporating iodoform and ether solution, who were fully impregnated with the former, felt no dizziness, headache, or other evil results, but were forced to go into the open air occasionally to avoid narcotism from the ether.

"After the pulp has been repeatedly treated with the paste, and between the periods of treatment excavated and syringed out with luke-warm water, it should not be further disturbed by instruments or otherwise, but should be capped with the iodoform cement." He regards temporary fillings as unnecessary, and says, "By my new method of treatment it is absolutely important to protect the restored pulp by a permanent filling."

The views of various members as expressed in the discussion which followed, may be briefly summarized:

Röder, of Odessa, had had no result in the past six months, in the treatment of inflamed pulps with iodoform.

Witzel said that before he had experimented with iodoform, of two hundred antiseptically treated teeth, he had not had a single failure, but since he had experimented with iodoform, of one hundred and twenty teeth, eighteen had been extracted. He had found in making sections of these teeth that it was impossible to fill every diseased tooth with absolute security.

Baume reported that the result of his experience with iodoform was satisfactory. It may be passed through the foramen without fear of injury.

Hagelberg believed that inflamed pulps could be treated satisfactorily under certain conditions with iodoform. He touched them first with carbolic acid and then treated with iodoform powder and filled with gutta-percha. He made use of arsenic very seldom for the destruction of pulps.

There are three conditions to be considered in the treatment of pulpitis, that have a very important bearing on the therapeutics of the question under consideration: 1. The antiseptic quality, or that property that will destroy the septic poison synchronous in its origin with the inflammatory condition. 2. A property that will allay the pain necessarily present. 3. The most important of all, the power to enter into chemical combination with the gaseous products of decomposition.

In a limited degree iodoform possesses all of these, and must, therefore, be one of the most valuable agents that we can use upon pulps in the earlier or later stages of pulpitis. Its antiseptic property is not so marked as that of carbolic acid; hence the latter is brought in combination with it. It has far greater anesthetic power than carbolic acid; hence is preferable as a benumber of pain. Its action in the presence of sulphureted hydrogen is of the same character as that of iodine; hence it meets this prominent difficulty and is especially valuable in the later stages of putrescent pulps.

The many failures met with in the treatment of exposed and especially of devitalized pulps necessarily lead to the inference that a routine course of treatment is usually followed, without proper attention to details and the ever varying conditions resulting from the progress of the inflammation. We have nothing that combines in itself all that we require, but the nearest approach to it is certainly in iodoform.

Without entering into the treatment of the pulp *in extenso*, as this would be foreign to the subject, it is necessary to remark that in recent

exposures, a treatment may be tolerated that would be impossible where the irritation had been long continued, although no evidence of pulpitis had been apparent. Consequently, while this agent is valuable in such cases, the greatest benefit will be derived where conditions exist which especially indicate its use, and these are irritated pulps and pulpitis proper and subsequent to removal of putrescent pulps.

In this connection and as fully illustrating the subject, I quote from an exceedingly valuable paper, read by Prof. Litch at the meeting of the Pennsylvania State Society in 1880, and published in the DENTAL COSMOS for February, 1882. That this paper has not received the attention its merits deserve is very apparent, but in the judgment of the writer it should be carefully considered, for it undoubtedly describes the best treatment that we are at present familiar with.

Dr. Litch states a fact patent to all of us, when he says: "When devitalization of the pulp takes place, not in a closed, but in an open pulp-chamber, putrefactive decomposition is the immediate and inevitable result, and whenever by accident or design a pulp-chamber thus circumstanced is changed from an open to a closed cavity, the consequences must be the accumulation of putrefactive matter and gases under pressure, and usually not only mechanical irritation but direct septic poisoning of the root-membranes. In either case, then, septic matter is that with which we have to deal and upon antiseptic agents our reliance must chiefly be placed.

"* * * The probability is that the basis and chief chemical constituent of putrefactive gases is sulphureted hydrogen, its odor being modified or intensified by admixture with these volatile or organic acids which result from zymotic changes. Such gases * * * collecting under pressure in a sealed pulp-chamber * * * constitute a source of mechanical irritation to the tissues surrounding the apical foramen, through which, if it be permeable, such pressure must be exercised. That this irritation is or may be purely mechanical and not specific is demonstrated by the fact that, upon opening the pulp-chamber, thus allowing the escape of the confined gases, the irritation or even inflammation which their pressure caused, will often entirely disappear."

After describing the effect of different antiseptics having the power to arrest decomposition he considers those having influence over the products of putrefaction. "In this respect a careful discrimination must be made between the powers respectively of such antiseptics as carbolic acid, creasote, oil of cloves, oil of thyme, oil of cajeput, etc., and such other antiseptics as chlorine, bromine, and iodine, which in addition to their anti-zymotic power are true chemical antagonists of those sulphureted hydrogen compounds of which putrefactive gases are constituted, such gases being immediately decomposed by

them, their hydrogen element going either to the chlorine, bromine, or iodine, to form respectively hydrochloric, hydrobromic, or hydriodic acids, the sulphur being in each case deposited * *"

The conclusions of Prof. Litch are amply borne out by practical observation and experience, and we have constantly demonstrated the unsatisfactory results following the use of the ordinary antiseptics. Carbolic acid not only fails to meet certain conditions in pulpitis or putrescent pulps, but has a tendency to aggravate the symptoms. Used as a five or ten per cent. solution it gives the best results, but beyond that it becomes an irritating force, without the power to overcome the gaseous products.

It must be apparent, then, that if carbolic acid does not fulfill our requirements,—and experience demonstrates it,—we are forced into another channel of treatment, and the only question then left to consider is, the most convenient agent and the mode of its application. Dr. Litch gives the preference to iodine, and it is possible that this preference is well grounded, as the question can scarcely be said to have left the domain of experiment. That iodine or its derivatives must be used seems clear, and, in the judgment of the writer, iodoform takes precedence, for the reasons heretofore given in this paper.

It will have been observed that the differences of opinion as to the value of this agent, by German practitioners, are very marked. Witzel, an authority on pathological conditions of the pulp, evidently has but little faith in it, while Skogsborg, thoroughly trained in this special experimental knowledge, takes decidedly extreme views in its favor, and at the same time Baumé, the distinguished editor and author, regards it as having been satisfactory. It would be difficult to account for this difference of opinion in men unaccustomed to careless statements or immature conclusions, did we not know that it is almost impossible for two persons to follow a given line of experiment in exactly the same way. The positive success of the one is a safer guide than the negative results of the other, where both are of equal ability.

The subject would be incomplete without some allusion to the mode of using iodoform, when to use it, and the quantity sufficient to give good results. The difficulty experienced with this is that it cannot be readily applied, as we find, in the minute yellow crystals. It requires to be combined with a medium that can be readily handled; hence the German dentists have made use of earths, as kaolin. To overcome the penetrating and persistent odor, some one or more of the essential oils have been made use of. It is questionable whether these are of much value, if indeed they are not a positive detriment. The most important thing is to get the full value of the drug, and that this may be done, it seems to the writer that it should enter a tooth

as nearly as possible in its original condition. It has been his practice therefore, to combine it with a ten per cent. solution of carbolic acid and apply it directly, on cotton, if necessary to carry it into the root; and if, as a capping or temporary dressing to an irritated pulp, in combination with carbolic acid and oxide of zinc, prepared at the moment of using.

The quantity to be employed, must necessarily be small,—about the $\frac{1}{30}$ of a grain,—as any larger amount has a tendency to produce nausea and a persistent, disagreeable taste. It is very valuable as an adjunct in capping, but its greatest value will be found in pain arising from irritated pulps and in putrescent conditions. Its anesthetic properties give valuable results in the former and in the latter it destroys the products of decomposition.

The danger of its use has been largely commented on: used in excess the effects may be unpleasant.

The main disagreeables attending it are nausea and headache. In one case the writer was obliged to remove a temporary stopping on account of the former, which had continued for ten days. It should be applied with care and judgment, and thoroughly covered to avoid any commingling with the salivary secretions. When this is done it is a valuable addition to our limited list of therapeutic agents.

TREATMENT OF PYORRHEA ALVEOLARIS.

BY A. W. HARLAN, D.D.S., CHICAGO.

Read before the American Dental Association, August 8, 1883.

On account of the uncertainty in the mind of the dental specialist, with reference to the treatment of that variously named and illy defined disease, known as pyorrhea alveolaris, Riggs's disease, alveolitis, phagedena pericementii, etc., the writer desires to offer a few suggestions relating thereto, which may tend to give more confidence to those who have had but little success in their efforts to restore to health the tissues which are so often ravaged beyond repair. It will not be necessary in this report to say anything of the etiology of the disease under discussion, beyond the expression of the belief that it is infectious, and that micro-organisms are at least partially responible for the disastrous results which are sure to follow if it is not checked before the complete destruction of the alveoli.

It is now nearly two years since I became convinced that the methods of treatment advocated by various writers, including that of Dr. Riggs himself, were not the most beneficial to the majority of cases presenting themselves. At that time I was engaged in making some experiments with the essential oils and eucalyptus globulus, to determine their value as antiseptics. During these investigations it

occurred to me that iodide of zinc, which then, as it does now, occupied only a few lines in the "Dispensatory" and works on medical chemistry and therapeutics, might be the remedy which would rob the hydraheaded monster of its terrors for the dental surgeon. I procured a sample and at once made solutions of xii. and xxiv. grs. to the ounce of water, and waited for the first case. It soon came. My first experience with it was in the fall of 1881, and the first case was that of a lower central incisor; the gum was loose two-thirds of the length of the root, on the labial surface, pus exuding on pressure, and the alveolar process wasted half the length of the root; there was little, if any, deposit on the labial surface of the root, and no salivary calculus on any of the teeth, except the buccal surfaces of the superior third molars. I carefully cleansed the root and excised the edge of the bone, then dried the pocket, after washing it out with water, and injected into it three drops of the first-named solution. The patient was directed not to squeeze the gum, but to return in four days, and let me see him. When he returned, I dried the gums and applied pressure, and found scarcely any discharge. I repeated the former treatment, omitting the scraping and probing, and when he returned the second time there was no discharge whatever. The pocket had commenced to fill up, and the gum was beginning to reattach itself to the tooth. The patient returned again after eight days, and there remained hardly a trace of the disease. To all intents and purposes it was cured. After the lapse of more than twenty months the gum remains firm, and is of normal color, without depression or any external evidence of having been diseased at all. The remarkable manner in which this remedy exerted its beneficial influence in this case caused me to practically discard all other therapeutical agents in the treatment of pyorrhea, except as shall be hereafter mentioned. I found from a study of cases that when a patient was suffering from an acute attack of pyorrhea the pockets should first be packed with iodoform and eucalyptus, iodoform and oil of cinnamon, or be thoroughly syringed with a one to three-grain solution to the ounce of water, of chloride of alumina, which is a good disinfectant and astringent, and also an excellent bleacher for discolored, pulpless teeth; but the method of using it in such cases will be dwelt upon in the discussion on operative dentistry. This method of treating the pockets in acute cases relieves the patient of present suffering, and also reduces the swollen gums to their normal size. In three or four days the sanguinary deposits may be removed and the edges of the alveoli scraped or burred off. The pockets should then be syringed with peroxide of hydrogen, which will cleanse them perfectly, and at the same time bring into direct contact with the diseased pocket a germ-destroyer and antiseptic not less potent than any which can be

named. After drying the gums, the pockets should be injected with the previously named solution of iodide of zinc, one, two, or three drops, or more, in each pocket. When the patient returns on the fourth day the gums must be dried carefully, and a fine cone of cotton or bibulous paper be moistened with peroxide of hydrogen and gently pressed into each pocket. If there should be any effervescence, it demonstrates the presence of pus, and each pocket must be again injected with the iodide of zinc solution. Peroxide of hydrogen, for all clinical purposes, is a perfect detector of pus, even better than the microscope, because those not familiar with it, can see with the naked eye the bubbling produced by H_2O_2 when brought into contact with pus.

In chronic cases, after the removal of the diseased bone surgically and the cleansing of the roots is effected, the pockets should be syringed with H_2O_2, to be followed by the injection of the xxiv. gr. solution of iodide of zinc in precisely the same manner as has been heretofore described. In very bad or almost hopeless cases, I use even a stronger solution, grs. xlviii. to the ounce; and when the gingival margins present a ragged border or cone-shaped slit, I apply the pure granular iodide to the edges of the slit once in three days, and soon find a perfect restoration of the normal festooning of the gingival margin. The injection into the pocket is to be repeated every fourth day. The length of time required for the cure of cases where two to four or five teeth are involved, varies from twelve days to four or five weeks, supposing the patient to be in ordinary good health. In those cases where constitutional treatment is required each must be met according to the indications, and the intelligent practitioner will decide for himself just what is needed during the period of local medication. The worst case that I have had during the past two years was where sixteen teeth were diseased, and it required constant care from March 26 to June 12, 1883. It was a case of three years' standing, and had been under the care of two gentlemen before it came to me, and the patient thought her gums were worse after leaving them than before treatment was commenced.

Iodide of zinc has long been used by medical practitioners, in the form of a syrup for internal administration, and as an ointment externally for strumous inflammation and enlargements, chorea, etc. It is made by digesting four parts of iodine with a little more than one part of granulated zinc and twenty parts of water, until the liquid has become colorless. On evaporation it crystallizes and is ready for use. It is freely soluble in water. I present herewith a comparative table of the relative value of antiseptics and germ-destroyers, which as all may see places iodine almost at the head of the list.

This table is the result of a large number of experiments by M. Miguel, of the Observatoire de Montsouris, and shows the minimum quantity of the several antiseptics capable of preventing the development of germs and of adult bacteria in a liter of bouillon:

	Gms.		Gms.
Peroxide of hydrogen	0.05	Arsenious acid	6.00
Bichloride of mercury	0.07	Sulphate of strychnine	7.00
Iodine	0.25	Boracic acid	7.50
Chloride of gold	0.25	Arsenite of soda	9.00
Bichloride of platinum	0.30	Hydrate of chloral	9.30
Cyanhydric acid	0.40	Salicylate of soda	10.00
Bromine	0.60	Caustic soda	18.00
Chloroform	1.00	Borate of soda	70.00
Bichromate of potassa	1.20	Chlorhydrate of morphine	75.00
Ammoniacal gas	1.40	Alcohol	95.00
Thymic acid	2.00	Iodide of potassium	150.00
Phenic (carbolic) acid	3.20	Marine salt	165.00
Permanganate of potassa	3.50	Glycerine	225.00
Acetate of lead	3.60	Sulphate of ammonia	250.00
Alum	4.50	Hyposulphite of soda	275.00
Bromo-hydrate of quinine	5.50		

Corrosive sublimate has the most powerful effect on bacteria; an aqueous solution of 1 in 20000 kills the spores of bacilli in ten minutes. A solution of 1-5000 is thus a certain disinfectant, even when the time of exposure is very short. Koch finds that an aqueous solution of corrosive sublimate of 1-300000 puts a stop to the germination of bacterial spores. Sulphurous acid does not rank high as a disinfectant. Bacteria clinging to dry objects are killed after twenty to thirty minutes exposure to an atmosphere containing 1 volume per cent. of sulphurous acid. Spores of bacillus subtilis and bacillus anthracis are still capable of development after 96 hours exposure to an atmosphere of 5 to 6 vols. per cent. of sulphurous acid; even when moist they are very hard to kill with it. It is thus a very untrustworthy disinfectant, all the more so because it has little power of penetrating compact masses or bundles,—(Wolfhügel, Buchholtz, Schotte and Gärtner, Koch, Buchner). Carbolic acid in five per cent. solution will kill the spores of the anthrax bacillus in twenty-four hours. A three per cent. solution, however, will not do so in the same time. A solution of 1-400 checks the development of bacterial spores. Vapor of carbolic acid at ordinary temperatures is without effect; at 55° C. it kills the spores in two or three hours (Koch). Chloride of zinc in five per cent. solution has no effect on anthrax spores, even when they have lain in it for a month (Koch). Iodine, bromine, and chlorine are far more active than sulphurous acid. Bacilli cease to grow in the presence of iodine in the proportion of

1-5000, and of bromine 1-1500. Iodine water and chlorine water kill spores in one day; a five per cent. solution of chloride of lime in ten days. Benzoic acid, sodium benzoate, potassium chlorate, and quinine have little effect on spores. The following substances, even in dilute solution, have a restraining influence on bacterial development: allylic alcohol; oils of mustard, peppermint, turpentine, and cloves; thymol, chromic, picric, hydrochloric, and salicylic acids; quinine. The effect is perceptible in solutions of 1-300000 for oil of peppermint, of 1-800 for quinine, of 1-75000 for oil of turpentine. All disinfecting agents should be used in aqueous solution. In alcohol or oil they are either inactive or enfeebled. Bacillus spores still retain their power to germinate after lying for months in absolute alcohol. Pure oxygen is known to kill bacteria outright.—*Page* 725, 275-8, *Zeigler.*

This system of treatment, based on the primary injection of H_2O_2 into the pockets, as a ready method of cleansing them, and at the same time furnishing nascent oxygen to destroy the unclassified micro-organisms there present, and the subsequent injection of the zinc iodide, for its well-known stimulating and protective effects on the reparative material exuded, which is always ready for organization after being thus carefully protected, renders it almost certain that if careless probing or syringing of the pockets is prohibited, and the mouth is well cleansed with an antiseptic wash, a reproduction of lost tissues may be confidently anticipated.

In conclusion, permit me to say that this remedy, when used faithfully in conjunction with peroxide of hydrogen, the most valuable germ-destroyer known up to the present time, arms us so well that I believe with expert handling of the probe to discover the concealed pocket, skillful removal of all deposits and edges of diseased bone, conjoined to an exact knowledge of constitutional needs, that we no longer need feel dismayed when brought face to face with a genuine case of pyorrhea alveolaris.

THE EFFECTS OF MALARIAL POISONING ON THE DENTAL PULP.

BY J. A. KLUMP, D.D.S., M.D., HARRINGTON, DELAWARE.

Read before the Pennsylvania State Dental Society, August 2, 1883.

It is not my expectation in this paper to present to this society any special information with regard to the effects of malarial poisoning on the dental pulp, but to elicit a discussion of the subject. I will endeavor to suggest a few points, the consideration of which may interest and profit us.

We claim as our chief object the salvation of the natural teeth. The rapid advancement in dental science is most encouraging to us.

Especially are the restorations of badly diseased teeth of to-day remarkable in contrast to our want of success in such cases a few years since. Our endeavors to place these organs in conditions most favorable to resist deleterious agencies are meeting with more success, and our methods are becoming more effective. The value of constitutional treatment is more appreciated, but is worthy of more attention than it has yet received. That something more than local treatment is required is consequently becoming more evident. Local treatment alone will, in many cases, prove a failure, but with general treatment combined, will give the desired result. There are cases where nothing but constitutional treatment will be effective. The subject of improving teeth of low vitality by putting into the system the elements in which such teeth are deficient, has been repeatedly discussed, and time and again have we witnessed such cases improve under this treatment; yet, in many instances, no benefit seems to accrue, and until we go deeper and take into account the important functions that preside over secretion, the normal performance of which is necessary for the assimilation of such elements, we may expect many failures. To look after the state of the nervous system, the blood, and the digestive organs, and have their functions properly performed, would be doing more, in many cases, for the health of the teeth than would be accomplished by administering the phosphates, etc., and risking their assimilation.

Especially should the nervous system receive attention. It has an enormous influence over the teeth, controlling circulation, secretion, and nutrition. Not only do general nervous derangements affect the highly sentient pulp of a tooth in general proportion to the nervous tissue involved, but, owing to its peculiar situation,—incased within a dense wall of dentine,—nervous phenomena which produce the slightest irregularities in the circulation will cause prominent symptoms of irritation here. The blood-vessels are subject to dilatation, and the surrounding tissues, principally nervous, must suffer compression in proportion to the amount of congestion. Considering the fact that death of the pulp in the majority of cases is due to strangulation, it becomes essential in its conservative treatment to combat all causes predisposing to congestion. Malarial poisoning being productive of marked irregularities in the distribution of the blood supply, and, moreover, creating serious nervous disturbance, and tending to a general lowering of the entire organism, its influence should be combated, in view of its effect upon the teeth. Irritation of the pulp is frequently the initial symptom of malarial impression, and not infrequently is of sufficient severity to cause death of the pulp in sound teeth, which is a common occurrence in highly malarious sections. That death of the pulp may be due

to malarial poisoning is assumed, because it occurs in subjects suffering from malaria, and when there is no other evident cause for the irritation; and the majority of cases of pulp-irritation under such circumstances yield promptly to early treatment with quinia. In the commencement of miasmatic fevers, it is not uncommon to have odontalgia of a neuralgic character, which is generally recognized by physicians as being of malarial origin, and they treat it as they would malarial pains of any part, by bringing about "cinchonism" as quickly as possible. We many times encounter cases of sensitive dentine of malarial causation, in which local obtundents have little if any effect. These cases are usually associated with general nervous excitability, and the mere touch of an excavator to the tooth will so unnerve the patient as to render an operation very unsatisfactory, if not impossible of performance. Here three- or four-grain doses of quinia, or the equivalent, of one of its alkaloids, given every four hours, until about thirty grains have been administered in anticipation of the sitting, will not only allay the sensibility of the dentine, but will produce such a quieting effect on the general nervous system that operations can then be performed with satisfaction to patient and operator. In these cases nothing but anti-malarial treatment will have much effect. The simple operation of capping is often, by the presence of malaria in the system, rendered very uncertain. This will account for the success of some practitioners in this operation, while others are ready to condemn it on account of its uncertainty. Between the month of June and the frosts of autumn, when this disturbing element prevails, we have, doubtless, all experienced its influence more or less in varying results from like treatment in different cases. In teeth successfully capped under favorable circumstances, trouble is subsequently excited by this agent.

In the personal experience of the writer, recently located in the malarial climate of Delaware, this has been forcibly demonstrated. In a tooth capped and filled in 1880 there was no discomfort experienced until the present summer, when during an attack of remittent fever there was an intense irritation of the pulp, which subsided in a few hours, cinchonism having been established in the treatment of the fever. The symptoms once recurred in a mild degree, coincident with the reappearance of positive symptoms of the malarial trouble. Case after case similar to this has come under my notice. A capped pulp, or the pulp of a filled tooth is specially liable to malarial disturbance—thermal changes doubtless assisting in a measure in exciting irritation. Or, the pulp being less vigorous on account of its artificial surroundings, yields more readily than in health. It is a recognized fact that congestion

is liable to involve a weaker organ. When there is a congestive tendency, a trifling irritation only is necessary to determine it to a given point.

As to the manner in which malaria excites irritation in the pulp we can only speculate. We know that in subjects saturated with malaria, the blood is found to have undergone a marked change; the red blood-corpuscles are diminished in number; the blood is thinner than normal, and pigment matter is frequently in such excess as to cause thrombi in the smaller capillaries. The walls of the blood-vessels lose their tenacity, thus favoring the effusion of their contents. The function of the spleen, as a diverticulum for the blood, is frequently interfered with, thus depriving the congested capillary system of the relief which a proper performance of the splenic function affords. The parasite which has been found in the red blood-corpuscles of malarial patients may contribute to the formation of thrombi, or its presence may be capable of establishing organic disease of the pulp, as it is believed to excite disease of the kidney, liver, etc., by its mere presence within these organs. From the known facts as to the nature of malarial poisoning, it is probable that the circulation in the pulp must be influenced by it in no small degree. The contracted apex of the root of a tooth is highly favorable to the formation of a thrombus within the pulp-chamber, while the blood-pressure necessary for forcing its return from the pulp-circulation, would favor effusion into the pulp-tissue—a result which we know would prove disastrous to a living pulp. The parasite may excite irritation from pressure if sufficient to occlude the blood-vessels, or their presence as a foreign body may produce irritation of the sensory nerves sufficient to bring about extreme congestion.

It cannot be doubted that malaria has a deleterious influence on the pulp of a tooth and on the health of tooth-structure generally, and it should certainly receive the attention its importance demands.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION—TWENTY-THIRD ANNUAL SESSION.

Second Day.—*Morning Session, Continued.*

(Continued from page 474.)

Dr. A. W. Harlan read a paper on "Pyorrhea Alveolaris."*

Dr. C. F. W. Bödecker had been investigating this disease. It is still an unsettled question as to whether or not bacteria is the cause of

*See page 517, current number Dental Cosmos.

this disease. He was of the contrary opinion; he thought they were the result, not the cause of the inflammation, for they are everywhere in inflammation, and present the same appearance under all circumstances. Antiseptics are useful in pyorrhea alveolaris, but they must be non-irritants. Some antiseptics, as bromine, are irritating, and are therefore unfit for this use. Iodide of zinc is valuable, but if its application is too long kept up it will do more harm than good. The speaker had been using tartrate of chinoline, which is derived from coal-tar, and he had obtained results from this salt which were simply marvelous. Teeth which, at the beginning of the treatment could be almost lifted out with the fingers, would become perfectly firm in their sockets in four or five weeks. Another remedy which gives good results is boro-glycerole; also, terchloride of phenol. The tartrate of chinoline is used in saturated solution, one drachm of the tartrate to two ounces of water. You should first remove all the calcific deposits within easy reach of the scaler, without tearing the festoons of the gum; then with a thin instrument, wrapped with cotton and dipped in iodochloride of zinc, not merely touch the inflamed surfaces, but thoroughly wipe around the necks of the teeth. Next time treat with the tartrate of chinoline; or with the iodochloride of zinc, if required. It is rarely necessary to apply the iodochloride of zinc more than three or four times. The object is to get away every trace of foreign matter. Keep the surfaces clean, and the case will move along readily.

Dr. Darby wished to say a word about iodoform, as an antiseptic and local antiseptic. It is one of the best remedies in odontalgia. One great objection to it is its intolerable odor. In speaking of pyorrhea alveolaris with a professional friend the gentleman had informed him of a new remedy, ordinary nitre. The crystals are pulverized in a mortar, and the powder is insinuated between the gum and the teeth. The gentleman said he had the best of results from its use.

Dr. Abbott. The best remedy for pyorrhea alveolaris is a carefully handled instrument. There is nothing else that will take the place of a thorough cleansing of the pockets of all irritating matter. If that is done, he will guarantee that in nine out of ten cases the gums will get well.

Dr. I. P. Wilson, Burlington, Iowa. Did Dr. Harlan succeed in getting a perfect restoration of the lost tissue, and in firmly reuniting the gums to the necks of the teeth?

Dr. Harlan. A cure was effected.

Dr. Atkinson. Reproduction follows the same order as original production, when you get a nidus for the pabulum which is wept out by the tissues. He could show to the doubting cases of fifteen years'

standing of reproduction of the alveolar process, which could not be told from original tissue. He had found some cases where the alveolar margins were thicker than they originally were, but this might easily be accounted for. Generally, not one in ten persons knows how to handle the brush. They brush across the teeth, which causes loosening and tearing of the gums. The lower teeth should be brushed up, and the upper teeth down, and never across. This question as to what is the best remedy, if there is any, to use in pyorrhea alveolaris has put a bog into the minds of many. If we understood how the tissues are reproduced, much of the difficulty would be removed. If we could fulfill all the conditions, there would be no local disease. Statistics are well enough, but if we have not understanding sufficient to interpret them, they are worse than darkness. We must understand the underlying principles before we can comprehend the details of the observations of our fellows. In removing the deposits beneath the gum, you have a little pocket into which pabulum can be wept out from the surrounding tissues. If all undue influences are kept away from the pocket, the pabulum is converted into protoplasm, then to the embryonal corpuscles, and then to the type of tissue demanded. He had never seen epithelium reproduced, nor muscle. One histologist says he has seen muscle reproduced. This proves that it can be reproduced. Nerve and bone the speaker had himself seen reproduced.

Dr. Abbott was sorry that Dr. Atkinson, when on the subject, did not follow the normal tissue back to inflammation, and thence to reproduction. In the case of pyorrhea the locality is the root of the tooth, which is an inflamed condition. What is inflammation? It is simply carrying the tissue back to embryonal tissue, that is, the condition from which it may be converted into whatever type the locality demands. The gentlemen present would remember that the speaker had placed the explanation of caries on this idea, the tooth substance being converted by decalcification and inflammation into embryonal tissue, and when the proper conditions are present this will be converted back into dentinal tissue. In the case of pyorrhea, you will, if the proper conditions are supplied, get a reproduction of the alveolar process.

Dr. G. C. Daboll, Buffalo. One difficulty that presents itself in the discussion is that we don't make any distinction in the expressions of this disease. We certainly have very different conditions in the cases that present themselves in practice. He had had more or less experience in the treatment of this disease during the past fifteen years, but he had never succeeded in reproducing the tissues where there was recession of the gums and absorption of the process. In cases where he could pass an instrument nearly to the apex of

the tooth, but where there was no absorption, he could bring the teeth back to a healthy condition. He had had some cases where the septa were absorbed, but they never resumed their normal condition. He had restored the teeth to a healthy state, but the gums were not perfectly normal. He could go no further in restoration than he had indicated, and he was much interested to learn of the new remedies offered.

Dr. Atkinson. Did you make a pocket?

Dr. Daboll. No, and I have never seen it done. I would be glad to have some man demonstrate it, though I do not discredit the statement that it has been done by others.

Dr. Atkinson. I have shown many cases, and can bring the witnesses. I have many specimens of necrosed bone in bottles, and if you were to examine the jaws from which they were taken you could not detect that there was any departure from normality.

Dr. Peirce congratulated the Association on the evidence of progress it had shown. It had discussed the paper and Riggs's disease, and Riggs's name had not been mentioned.

Section VI. was passed.

Section V., Anatomy, Histology, and Microscopy, was taken up, and the paper by Dr. C. F. W. Bödecker, New York, previously reported, was read by its author. It was entitled, "On the Action ot Arsenious Acid upon Dentinal and Pulp Tissue."*

Dr. Bödecker asked that the discussion of the paper be postponed until those of the members who were microscopists might have an opportunity to examine the specimens which he would have arranged for inspection. The request was granted, and the discussion of the paper was made the special order for the evening session.

Section VII., Physiology and Etiology, was called, and Dr. W. C. Barrett, chairman, read the report, as follows:

The members of Section VII. note with pleasure the increased attention which etiology is receiving from the profession. Those matters which are nearest to our eyes look the largest to us, and we may, therefore, be excused if we urge yet further study in physiology and etiology, as the most important subjects which can engage the attention of the dentist. Physiology is the study of the laws which govern function, and the sole end of medicine is the attempt to regulate disordered systemic action. Do we, then, overrate the significance of this section of our work, when we claim that it is the foundation upon which all departments of medicine rest? that a thorough knowledge of physiology is requisite to the proper practice of any branch of medical science? that, in truth, all the de-

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* See page 505, current number DENTAL COSMOS.

partments of actual medicine, surgery, practice, obstetrics, ophthalmology, otology, dermatology, dentistry, etc., are but the continued study of normal or diseased function, and, therefore, only distinct branches of physiology?

We are too apt in our essays upon, or discussions of, practical subjects to pre-suppose in our own hearers an acquaintance with the laws which govern systemic action; when the truth is that comparatively few are competent to appreciate a technical paper, because of their ignorance of the advance in physiological knowledge. Nay, more. Our literature is full of articles by authors who propose methods and prescribe remedies that evince an almost total lack of knowledge of the basal principles upon which medicine rests. Membership in Section VII., and a thorough study of the principles which it is its duty to consider, would greatly benefit most of the members of this association, while it could harm none of those who might be comprised in the small remainder.

Etiology is fitly linked with physiology in this Section. If any man expects to practice intelligently and successfully, it is necessary that he understand, not only what normal function is, but what is the point of aberration and degeneration into diseased action. He who does not know the source and origin of any abnormal action can but prescribe empirically, if he prescribes at all. How can one make a diagnosis or prognosis if he does not comprehend the nature of the disease; and how can he become acquainted with its character until he shall have learned its origin? In that disordered condition called pyorrhea alveolaris, for instance, the profession has not settled upon any distinct, determinate practice, because there is a diversity of views concerning its origin, or rather an ignorance of its nature in the minds of the great majority of practitioners of dentistry. Of dental caries the most antagonistic views are held by men of eminence in the profession, and, as a consequence, we are at work empirically—on the cut and try principle. Some of our best known dentists fill teeth specifically; that is, they have one specific remedy for all dental caries. They use nothing but gold, or employ only amalgam; but for this exclusiveness they are not able to render a physiological reason. What one of those who pretend to practice eclectically can exactly prescribe the pathological condition in which he always uses gold in his operations, or can intelligently describe the precise state of function which demands gutta-percha or a mercurial filling? We are all at sea upon this subject, because of our ignorance of the etiology of dental caries.

But during the past year or two, dentistry has undoubtedly made greater advances in this direction than for a whole generation previously. At the International Medical Congress, held in London, in

1881, the cause received a great impetus, and this has been followed up by the studies and observations of a number of devoted men, nearly all of whom we may be proud to claim as American dentists. Their researches have not led all of them to the same conclusions, but in the diversity of views presented we find the best indication of the comprehensiveness of the investigation. Progress has been made, and if we cannot claim that the end has been reached, we are very sure we are much nearer to it.

Among the views which have been urged by American etiologists the principal ones are, the chemical theory, first propounded by Mr. Robertson, of Birmingham, England, and ably advocated by Dr. Watt and others in this country; the chemico-vital theory of John Tomes; the inflammation theory, first propounded by Fox, but modified by Abbott and Bödecker, to accord with the bioplasson doctrine of Carl Heitzmann; the bacteria hypothesis, as advocated by Leber and Rottenstein, by Underwood and Miller, and by what may be denominated the Springfield school of this country; and the electrical theory of Dr. Bridgman, of England, which has been adopted—in part at least—by what is known as the "new departure" school of etiologists in this country.

There is another American dentist who has made extensive and original, as well as truly scientific observations, Dr. W. D. Miller, of Berlin, whose writings have attracted wide attention both in Europe and in this country. He has not adopted the views of any of those mentioned, but by a long series of experiments in the laboratories of such men as Koch and DuBois-Reymond, he has arrived at the conclusion that dental caries is not due to any one cause, but is the result of a number of factors, all of which must be duly considered in the solution of the problem. His experiments are not yet concluded, and it is to be hoped that he will succeed in throwing yet more light upon this much-vexed subject.

Dr. C. N. Peirce, from the committee appointed last year to award a prize of $200 to the best essay on the "Etiology of Dental Caries," reported that the committee had received a paper, which they desired to present to the association, as there were but two members of the committee present, and they were undecided as to whether to award the prize or not.

After discussion as to the propriety of receiving the paper, it was pointed out that the report of the committee need not be made at this session, and that if the committee were in doubt the matter should be held open for further effort.

Dr. J. Edward Line, Rochester, offered a resolution to suspend that portion of the constitution which declares that all papers read before the association shall be considered its property, and be published for

its benefit, to permit the reading of a paper by a member, who wished to have it published at once in the journal with which he was connected. The resolution was negatived.

Section VII. was passed.

The privileges of the floor were extended to Dr. E. V. Richardson, of London, England, who briefly returned thanks for the honor.

Section I., Artificial Dentistry, Chemistry, and Metallurgy, was called. Dr. T. L. Buckingham, chairman, stated that in lieu of a report, the following gentlemen would present their views orally: Dr. Buckingham, on "Chemistry;" Dr. Trueman, on "The Richmond Crown;" Dr. Kingsley, on "Appliances for Improving Speech;" Dr. Matteson, on a "New Method of Inserting Artificial Crowns;" and Dr. Stockton.

Dr. Buckingham said we were, as a profession, very far behind in chemical knowledge and chemistry as applied to dentistry. There was little in our literature concerning it. Tracing it back we find that a knowledge of chemistry comes even before physiology in importance. We want a more extended knowledge on this subject, and a wider application of that knowledge. We want to know, for instance, why and how arsenic acts when it is applied to the dental pulp. We can describe the order of the building up of the tissues, but how it is done we do not know, nor can we know, without a thorough knowledge of chemistry. We can trace back the molecules through the various steps, but when we come to explain how those steps are taken we are stopped by the lack of chemical knowledge. If the pericementum of a tooth is destroyed we know that it can in many instances be made to grow again; but how does it grow? If we put nitric acid on silver, we know that nitrate of silver is formed, but we do not know how the atoms of the nitric acid pass over and take hold of the atoms of silver. And so through the whole range of our operations, if we study the subject properly, we can learn very much more about chemistry in its application to dentistry.

Dr. W. H. Trueman, Philadelphia. Within the last few years there has been shown a strong disposition on the part of mechanical dentistry to encroach upon the operative branch. This is probably an outcropping of the growing desire of the profession to preserve the usefulness of the natural teeth as long as possible. This is seen in the increased thought given to pivot-teeth; and still more, in the efforts made to dispense with partial plates, and replace them with appliances rigidly fixed to roots, or to the remaining teeth, or to both. It has indeed become a question where to place the dividing line between mechanical and operative dentistry, as these appliances, to be really successful, demand the best skill of both branches combined.

The advantages of a denture that is firmly fixed and leaves the mouth entirely free are very great. It is the nearest approach to the organs they replace we can obtain; but there are also disadvantages associated with it not to be overlooked. Unless great care is used in their construction, they will prove very temporary and a source of discomfort as long as they are retained. The difficulty of keeping them clean and free from the accumulation of food is a serious drawback to their usefulness. Where roots can be used and the fixture arranged without injury to any of the remaining teeth, there is no question that to make the attempt is good practice. But are we justified in destroying the pulp of a sound vital tooth? Are we justified in even cutting *into* a sound tooth to secure anchorage for such an appliance? Would it be good practice, for instance, where a lateral was missing, to destroy the pulp of a perfectly sound adjoining canine, cut off the crown, and mount two teeth on its root; and, perhaps, also, cut a cavity into the central to give the fixture additional firmness, as I am told, is being done, I am pleased to add, by dentists who advertise extensively,—for I cannot conceive that a *real* dentist would ever commit so great an outrage.

We may often to advantage make one root support two or even three teeth, where the conditions are favorable, as I have done several times; but when we make a fixture that is rigidly fixed to two or more roots or teeth, is not the risk of failure largely increased? We all know how uncertain a pulpless tooth is. Is it not a great risk to rigidly fasten several of them together with an apparatus that is not readily removed? What will be the probable result if any of them becomes inflamed, as they are so liable to do? And, again, the advocates of bridge-work, as it is called, advocate attaching eight or ten teeth, or even an entire denture, to four roots. What will be the probable effect on these four roots thus made to do the work of two or three times their number? It seems to be one of those things in which it will be well to advance slowly. It may be practicable. I saw two such arrangements in the same mouth, constructed in Paris about 1856. On each jaw were about ten teeth, mounted on a heavy half-round gold wire, and rigidly fixed to about four roots. The roots had been plugged with wood, and gold pivots soldered to the fixture driven into it. In each jaw were several natural teeth, but the dentures had no connection with them. Nearly all of the roots of the missing teeth were in; they had been filed down, and the wire rested upon them. I understood from the patient that she suffered very much for several weeks after they were inserted. When I first saw the case, it had been in place about twenty years, had never been removed, and had given entire satisfaction. It was lost some five years after from recession of the

gums loosening the roots. In that case, there is no doubt the patient had a far more comfortable and satisfactory denture than plates would have been. But, I must add, the odor from the roots and the accumulation of food the patient was unable to remove was very, *very* vile.

Bridge-work is not to be utterly discouraged; in skillful and discreet hands its capabilities are great, and so long as it is confined to roots or teeth of little value, it can be made to relieve the patient of the inconvenience of a plate,—at least for a time,—make a more serviceable denture while it lasts, and, if it does hasten the loss of the roots, it leaves the mouth in no worse condition for a plate than it found it. When we see how much has been done to make pivot-teeth more permanent and cleanly, who can say what persistent efforts may not do for this?

Dr. C. S. Stockton, Newark, N. J., hoped that the other Sections would be enabled to so promulgate the knowledge of the care of the teeth, that very soon there would be no occasion for a Section on Mechanical Dentistry. It is difficult now to draw the line between the operative and mechanical departments. The mounting of a Bonwill crown is almost an operative procedure; the Richmond and Matteson operations are almost mechanical. One point he wished to refer to: It has become the practice now with some operators, when one of the anterior teeth is lost, as for instance a lateral incisor, to cut off the crown of an adjoining tooth, and upon the root to build a substitute for it and for the lost tooth. This seemed a remarkable error. The idea that a dentist might sacrifice a sound and useful tooth for any cause except actual necessity deserved the severest condemnation of this body. As a matter of course, all roots and all teeth that can be made serviceable should be saved. That is where therapeutical dentistry comes in. There are very few teeth that cannot be restored to usefulness. A gentleman had called his attention to a method of holding full upper sets in position while doing away with the central suction-chamber. The plate is made very thick upon the alveolus, and a portion of the outer part of the alveolar border is scraped away. He was inclined to think favorably of this. He had made a plate without any suction, some six years ago, and the adaptation is still perfect. The only value there is in a suction-chamber is at first.

Dr. C. F. W. Bödecker said, some six or seven months ago, in the New Jersey Central Dental Association, Dr. Timme had exhibited a hydraulic press invented by Rudolph Telschow, Berlin, Germany, for swaging plates. He had tried the method in a few plates and found it worked very satisfactorily. A plaster impression is taken, and into this for the die is poured a composition metal, composed of

sulphur and plumbago. It melts at a very low temperature and hardens quickly. The gold for the plate is partially fitted over the die with the fingers, and then the fitting is completed by pressure with the machines. He had never seen anything to exceed the perfection of adaptation secured.

Dr. A. N. Priest, Utica, N. Y., thought if the method was looked into closely it would be found that the plates were stretched unduly and liable to break at the anterior part of the alveolar ridge. Better results could be got by other methods, by cutting and lapping, and hammering the plate, so as not to stretch it.

Dr. Bödecker. It is not meant by this process to do away entirely with hammering. If the alveolar ridge is very hard, we must use the hammer. This process is merely intended to give a good fit.

Dr. A. E. Matteson, Chicago, described his method of mounting artificial crowns. [The process would be difficult to make clear to the reader without illustration, and it is therefore omitted.]

Adjourned.

(To be continued.)

SOUTHERN DENTAL ASSOCIATION—FIFTEENTH ANNUAL SESSION.

Second Day—Afternoon Session.

(Continued from page 485.)

The Committee on Hygiene was called, and submitted two papers, by Dr. E. S. Chisholm, of Tuscaloosa, Ala., and Dr. R. Finley Hunt, of Washington, D. C., respectively.

Dr. Chisholm read his paper, of which the following is an abstract:

The paper stated the belief of its author that over-medication is one of the worst evils of the day. Can we question the entailment of pernicious effects upon posterity caused by the mal-use of alcohol, opium, and mercury? or of quinine, so habitually used by the inhabitants of malarial localities as to render the system impervious to its effects, to greatly increase the susceptibility to morbid nervous disorders, to injure the hearing, etc.?

Proper hygienic ends are not reached through over-medication. Hygiene simply means the adoption of the most successful protection against causes tending to promote disease. A very small proportion of the human race are blessed with such perfect conditions of form and texture as to require only preventive measures. Where regularity of position and an unbroken arch are found, affording the best facilities for chewing,—so necessary to the health of the teeth and gums,—with perfectly formed teeth, over whose surfaces a well-formed enamel is spread, no hygienic aid is needed. If, however, there are tendencies

to decay, or decay has already begun, means should be taken to assist nature in effecting a cure. This involves local treatment by means of the proper filling-material, and as well systemic treatment to supply internal deficiencies. If the teeth are crowded, separation is indicated, by extraction of those most liable to decay, if necessary to get room in that way, or by V-shaped self-cleansing spaces. The age and condition of the patient must be taken into consideration in any remedial measures. Susceptibility to decay is much greater in patients under eighteen; in such, filling with plastic materials, which can be thoroughly adapted to the walls, is preferable, though gold fillings carefully adapted, but requiring a change ultimately, will also preserve these teeth. Great care should be taken to secure absolute cleanliness, with brush and pick. The former is sufficiently well-known but is not used enough. The latter is not sufficiently appreciated. The best form is the goose-quill. Patients should be instructed to use these—not merely once a day before breakfast, but habitually after each meal, more especially after the last, each day. Dentifrices adapted to the conditions of the oral cavity should be prescribed as indicated. Sometimes the removal of calculus or the extraction of roots or of diseased teeth is necessary to relieve diseased conditions. Disease is never cured directly or exclusively by healing agents, but indirectly by bringing about such physical changes as will allow nature to do the work; this accomplished, strict regard to the laws of health will continue the preservation of the teeth.

Dr. Hunt's paper, on the same subject, was read by its author. Below will be found its principal features:

We have difficulty in finding a starting-point for our investigations into dental hygiene, because teeth are presented to us in every conceivable physiological and pathological state, and we know that they not only are affected by the functional action of other parts of the human system, but are complicated with antecedents reaching far back. It would simplify matters if we could wipe out these antecedents and their effects, and, taking the teeth in their perfect state, prescribe rules for their preservation and health; but this is impossible, and we find it necessary to go back and trace out these antecedents, not only in the former years of the life of the individual but, because of the influence of heredity, in former generations. Unfortunately, in former years, speakers and writers upon this subject did not take a broad view of the question, but confined their investigations to almost single causes for the deterioration and decay found in the teeth, as the use of coffee or tobacco, or soft foods, or the elimination of the phosphates from the cereals by bolting, and they expressed their belief that if these single faults were corrected the human teeth would be restored to a healthy condition. While we must admit

that these and like practices have more or less pernicious effects on the teeth, it cannot be claimed that any one of them, even in its abuse, can produce all the pathological states seen in the oral organs. It would be nearer the true solution to say that all the single causes hitherto named and probably some others not thought of are instrumental in producing the results brought under our observation. The contradictory conditions found in the same mouth confound and bewilder us, if we confine our investigations to single or limited causes of decay of the teeth, and consequently to single or limited rules for dental hygiene. There are certain conditions precedent, indispensable to the normal performance of normal function, in the absence of any one or more of which the performance of the function is proportionally abnormal, or ceases partially or wholly. Hygiene is comprised in ascertaining, as far as possible, what these conditions precedent are, and devising rules by which they and others unascertained may be brought into such harmony as is requisite for the normal performance of normal function. Nature always acts in accordance with unvarying laws: under the same conditions precedent the same causes always produce the same effects, any apparent variation being due to a modification of these conditions precedent. Human disease and human suffering are beyond a doubt the result alone of a disregard or violation of these laws. The means of repairing the effects of such disregard or violation, that inherent power of recuperation which does its work of restoration and repair so beneficently through the normal performance of normal function, is implanted in the human system. But before this power can act, in most cases, therapeutical treatment must precede and accompany, to a variable extent, hygienic treatment. It may be propounded as a general if not a universal rule that therapeutical or surgical treatment never *per se* cured disease; but it is an invaluable and indispensable pre-requisite to a cure. The health of the teeth and that of all other parts of the system are closely connected with and dependent upon each other, and no complete system of rules can be devised for the promotion of the health of the teeth that does not include that of the whole human economy. From what has been said it follows that we shall be successful when (and not till then) we bring together in harmony the conditions precedent indispensable for the promotion of health. To ascertain what these are, so far as they are comprehensible by us, the best plan would seem to be to see where, on the one hand, where is a disturbance of the normal functions as shown in the deterioration and diseased state of the teeth and other tissues of the oral cavity, as well as other parts of the body; and where, on the other hand, the absence of the symptoms of disease show the harmony of the conditions precedent and

the undisturbed performance of the normal functions, and what are the habits of life in each case, because from the stand-point of this paper these habits constitute the hygienic or anti-hygienic rules; and in doing so the examination of peoples and tribes and races will be more satisfactory, and more conclusive than that of individuals. The perfect development, coadaptation, and health of the oral organs and tissues are found to exist to a far greater extent among the uncivilized than among the civilized peoples. It can but be concluded that where the teeth are perfect the hygienic laws have been obeyed, and where they are imperfect these laws have been violated. In the case of the uncivilized races the conditions precedent are abundant fresh air and light, ample physical exercise, simple, plain food of such character as to require thorough mastication, and water as a beverage. In the civilized races almost the reverse obtains. In the former the power of assimilation of food and the distribution of tissue-materials is perfect; in the latter, impaired. Where these powers are defective, food containing tissue-material will be introduced into the stomach, even in excess, in vain. The conclusion is that the only true hygiene is to so live as to have an abundance of light and fresh air, to take ample exercise in the same, to eat plain and simple food—only when hungry—to thoroughly masticate the same, and to use water as a beverage.

Dr. W. D. Dunlap, Huntsville, Ala., understood that Dr. Hunt's paper summarized the essentials of dental hygiene to be plain food, an abundance of fresh air, with ample exercise, etc. He must agree with that idea, in the main, but he had seen some things which staggered him. He had observed that the negroes on the plantations have worse teeth than the whites, though the lives of the negroes were more nearly in accordance with the rules laid down by Dr. Hunt than the mode of living of the white people.

Dr. Geo. H. Winkler, Augusta, Ga., had observed that a few drops of alcohol on the brush after each meal formed a very excellent mouth-wash.

Dr. Hunt fully expected that the question raised by Dr. Dunlap would be brought forward. He had cited Indian tribes as having excellent teeth; but there are other Indians—notably the Diggers—who have wretched teeth, and yet their mode of life in some respects comes near to the conditions laid down. He had studied the teeth in a large number of skulls of aboriginal races of America, in the Army Medical Museum, at Washington, and in a total of sixteen thousand teeth which were examined, there were only fifty which were decayed. They were mostly regular, with broad arches. There was one case of irregularity. In this instance, the father was white, the mother an Indian. He found also that the Sandwich Islanders, before their is-

lands were invaded by the whites, had good teeth. He thought the hygienic measures he had formulated were founded on sound reasoning. In considering the question of hygiene, physicians, while they lay great stress upon the necessity of proper food and exercise, do not impress sufficiently the importance of the light of heaven and the fresh air which are so necessary to health. The fact is that disease is the result of disregard or violation of hygienic laws. If we put the known facts together those laws are easily found. If we obey the laws implicitly, we can preserve the health, and by the aid of the recuperative powers can restore it when it becomes impaired. But these laws, to be effective, must be adopted by the whole people from generation to generation. If you improve the general health of the community, it follows that you improve the quality of the teeth also.

Dr. W. H. Morgan, indorsed both the papers, in the main, but he did not understand Dr. Hunt's recommendation of water as a beverage. If it is meant to use it to "wash" the food into the stomach, as coffee is used, he could not admit that that was sound teaching. The Americans have a most pernicious habit of only very imperfectly masticating their food, and then washing it into the stomach with liberal potations of water, coffee, and the like. There are two sets of glands provided for lubricating the food as it is chewed, but this habit utterly defeats their purpose, and the food in consequence goes into the stomach in a state that nature never intended. The food should be thoroughly chewed, thereby inciting the glands to free action, their secretions being intended to assist the stomach in the digestion. Any departure from that habit interferes seriously with proper mastication. To add to the enormity of the offense, it is not uncommon to use ice-water, which actually retards digestion, to wash the unmasticated food into the stomach. Such practices cannot be sufficiently reprehended. A great deal has been said of late years about what constitutes a proper diet; that in many articles of food in common use there is not the proper amount of bone-making material. He had formerly accepted that doctrine without question, but of late he had been examining the question and he had found that much of what has passed current and been received as fact is not proved. The system is said to be built up or renewed once in seven years. In the man of average size the bony structure weighs about eight pounds. It was not difficult to calculate the average amount of bone-making material which should be supplied in order to meet the requirements. [Dr. Morgan then showed by figures that all the foods in ordinary use have enough of the bone-making material to support life and build up the bony system.] The Chinese are a rice-eating people; they have, as a rule, perfect teeth. The North American Indians rarely have decayed teeth; their principal food is meat. The Greasers,

in Mexico, live on meat and bread, and they have good teeth. Here we have examples of good teeth from widely varied foods. What is the cause of the degeneracy of American teeth we do not know. There is something back of what appears on the surface—some interference with nutrition which must be sought out if we are to successfully combat the tendency to decay. Among people who are scrofulous the teeth are very inferior, and break down soon. The negro race are scrofulous. Their entire osseous structure is less compact than that of the white man. Statistics show that wherever scrofulous diseases prevail, the teeth are bad.

Dr. H. J. McKellops, St. Louis, said that Dr. Patrick, of Belleville, Ill., has been tabulating the skulls of the Mound-builders; he had examined some five hundred, and it was a rare exception to find good teeth among them. He found the same conditions as prevail to-day. He had found diseases of the teeth among the Indians of to-day, the Crows, Flat-Feet, etc. They have toothache: it is not so common as among the whites, but still it prevails among them.

Dr. B. H. Teague, Aiken, S. C., had seen the lower maxilla of the skull of an ancient Briton which was found some ten or fifteen feet below the surface of the ground. All the teeth of this jaw were in good order, though there was some irregularity of position. He had examined the teeth of many negroes, from the country as well as from the town, and there was very little difference between them. Both are subject to decay in a marked degree.

Dr. G. F. S. Wright, Columbia, S. C., asked if Dr. Morgan denied the theory of the necessity of supplying lime-salts artificially.

Dr. Morgan. The lime-salts are in the foods. If you give what is a proper food, you will see if the lime-salts are not there in superabundance.

Dr. J. R. Walker agreed with Dr. Morgan as to the effect of scrofula on the teeth, but not as to there being no need of more lime-salts than there are in the food. What makes the difference in size between the men of Tennessee and Kentucky, from the lime-stone districts, and those from the lowlands? If you take a family from these regions, the members of which are of large size, and remove them to the lowlands in Louisiana, you will find that in two or three generations, their physical aspect has entirely changed. Instead of being large and bony and muscular, they will be short and stout, and will lack the hardness which formerly characterized them.

Dr. Morgan did not know, but he thought it was rather the result of general than local conditions. The general condition determines the general health.

Dr. G. J. Friedrichs thought Dr. Morgan could prove his position. Some of the finest specimens of humanity that the speaker had ever

seen were from Amite parish, Louisiana, which was not in the limestone district.

The subject was passed.

(To be continued,)

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular meeting, April 24, 1883, at the house of Dr. J. W. Clowes. The meeting was called to order at 8 o'clock P.M., Dr. S. G. Perry, the president, in the chair.

The death of Dr. F. H. Clark was announced to the society.

Dr. B. Lord. It was my privilege, Mr. President, to be acquainted with and to enjoy the friendship of Dr. Clark for thirty years. There are others present who also knew him well. It is to be hoped that his history, in its connection with dental practice, will be properly noticed by this society. Dr. Clark was a leading dentist more than forty years ago. He must, I think, have commenced the study of dentistry about fifty years since, and he was in practice forty-two or forty-three years, having been out of practice for five or six years before his death. He was at one time associated with Doctors E. and J. Parmly. He was highly respected, both personally and professionally, and was much liked by his patients, having had many warm friends among them. He took very great interest in dental societies, and for many years helped to give those in this city usefulness and character. His memory will be held in high esteem, both for his personal and professional worth, and for his labors toward the general progress and improvement of the dental art.

Dr. Hawes. Dr. Clark was so well, so long, and so favorably known, that I think some formal expression of our sentiments should be made by the appointment of a committee to draft resolutions expressive of our feelings toward him and of our sympathy with his family in their bereavement. He was a very genial and social gentleman, and an honorable and faithful practitioner, and I think it would be proper for the society to take some action in the matter.

Dr. Francis. I was acquainted with Dr. Clark for many years. The last time he attended a meeting of this society was at my country residence in Connecticut, last June. It was quite an effort on his part to go there, but he desired to meet the members of our society, and he made the effort. I afterwards received a letter from him, thanking me for the invitation and for the pleasure he derived. Dr. Clark was one of those men who do honor to our profession. We all know that he was a very faithful worker, and one of the

most upright and conscientious of men. I trust this society will show some appreciation of their regard for him.

Dr. Lord. I second Dr. Hawes's suggestion.

Thereupon, a committee to draft suitable resolutions upon the death of Dr. Clark, consisting of Drs. Lord, Hawes, and Francis, was appointed.

Dr. William Jarvie, Jr. I would like to present a singular case before the society which was brought to my notice to-day. A physician came into my office this afternoon to ask my advice in regard to it, the history of which he related, about as follows: A patient of his, a gentleman about 30 years of age, in robust health and of good habits, in January or February of last year seemed to become somewhat morose, rather ill-tempered, and quick to take offense, and from that the symptoms have gradually run into those of acute mania, so that now he is not to be depended upon at all, and requires a nurse with him all the time. Some few months ago his physician advised a change of air and scene, and he went to Bermuda. He arrived home on Sunday in pretty much the same condition as when he went away. The family and his physician have been unable to get any clew whatever as to the cause of this malady; but, since the return of the gentleman with, I believe, his mother and sister, they have seen an article, which appeared in the *Sunday Times* four or five weeks ago, in regard to mania arising from disturbance of the tooth-pulp; and since reading that article the family have remembered that at the very time when this disturbance commenced he wert to his dentist to have a tooth filled. The dentist removed an old filling, and told him at the time that there was a little pus and blood exuding from the pulp-cavity; the operation was quite painful, and there was a great deal of pain in the tooth for a week afterward. The family are able to fix the exact date, from the circumstance that it was on the same day on which he went to pay a visit to a friend, and when he returned from this visit, two weeks afterward, there was this great change in his disposition and temper. Along with this is a disturbance of the aural nerves, his hearing being less acute than it was formerly, and he is troubled with neuralgic pains on the same side of the face. Since reading that article in the *Times*, the family have thought that possibly there might be some connection between the tooth which was filled at that time and the changed condition of the patient, which occurred immediately after the filling of the tooth. I told the physician that the only points in his history of the case which, to my mind, could connect the filled tooth with the subsequent trouble, were the condition of the pulp at the time the tooth was filled and this neuralgic affection of the same side of the

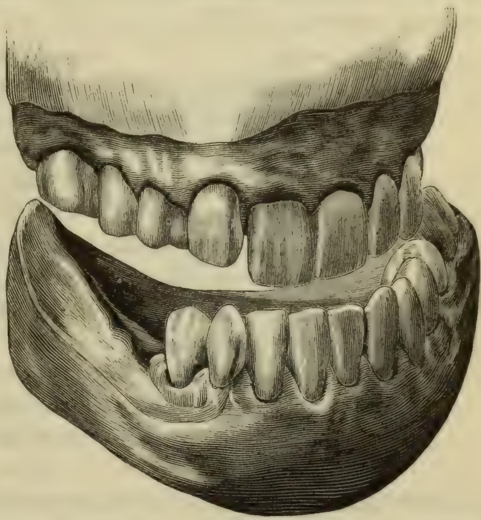
face. I told him that I would bring the case before the society to-night and see what the gentlemen present thought in the matter. Is it at all likely that there is any connection between the mental disturbance and this tooth? In this article published in the *Sunday Times*, a very similar case is described, where a Boston gentleman, 33 years of age, from disturbance of the pulp became quite insane, irresponsible, and unable to attend to business, and the removal of the tooth in that case was followed by complete recovery to health and strength.

A Member. That was attributed to an amalgam filling, I think.

Dr. Jarvie. Perhaps so; but if it is admitted that an amalgam filling pressing against the pulp caused mania in that case, why may not the same thing occur under a gold filling?

A Member. What kind of a filling did the dentist put in this tooth that you speak of?

FIG. 1.



Dr. Jarvie. I do not know.

A Member. What is the condition of the tooth at this time?

Dr. Jarvie. That I do not know. The man is not in condition to tell anything about it.

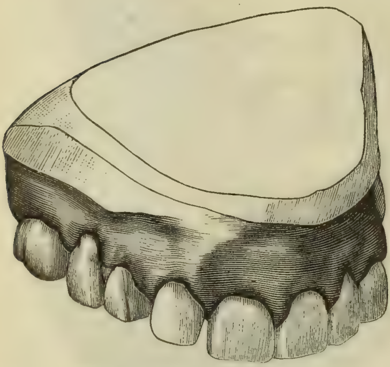
A Member. What would you do in the matter?

Dr. Jarvie. I do not know, as I have not seen the gentleman. I presented the case, thinking that, perhaps, some one here might be able to throw light upon it from experience in some similar case. I never heard or read of such a case until I saw this article in the *Sunday Times*, which article might be repeating the history of this very case, they are so exactly alike, except the extraction of the tooth and complete recovery following it.

Dr. C. A. Woodward. The case that I have to present is one of rather unusual interest. A lady, aged about 40, came to see me two or three months ago, saying that she came more particularly to please some friends than with the idea that anything could be done for her, although her deformity (See Fig. 1) had been exceedingly mortifying to her. (The distance between the cutting-edges of the upper

and lower teeth, when the jaws were closed, was three-eighths of an inch.) For twenty years she had secluded herself from society, more or less, on account of the malformation of her jaws, which was of a nature and degree sufficient to attract the attention of strangers whenever she went into public places. Indeed, she would see them instinctively protruding their jaws as they gazed. Some twenty years ago she visited a dentist, who considered the case of sufficient importance to call in several professional brethren in consultation. They took a photograph of her face in different positions, and finally constructed a rubber plate which capped over her lower bicuspids and molars, the caps being connected behind the incisors, in order to afford her a resting place for her jaws. This also gave her some assistance in mastication and opened the bite considerably; for without this plate her chin and nose would nearly meet. If you will remember, I presented a model of this case before this society at a previous meeting.

Fig. 2.



What to do with the case was, for some time, a problem. But I had had some experience with continuous-gum work and rubber combined, and it occurred to me that if I could cut off her upper teeth sufficiently, I might be able to construct a piece of continuous-gum and rubber to cover her teeth and gums, which would correct the mal-expression of her mouth. I succeeded in cutting off her central incisors about one-third, I think (See Fig. 2). It was done without a great deal of pain, and they were not very sensitive afterwards. I then had constructed a plate of continuous gum and rubber, the continuous gum covering the teeth entirely, and the outside of the gum as far upward under the lip as I could get the impression. The plate was put in on a Wednesday. I did not give her any special instructions as to how often she should remove the plate for cleansing it, but made an appointment with her for the following Saturday. She came on that day, and told me that she had not removed the plate from her mouth at all, that it was perfectly comfortable, and so firm that she was afraid to remove it, fearing she could not get it back again. I have seen her once since then, which was a week after that, and she was wearing the plate with comfort, never taking it from her mouth except for the purpose of cleansing. That was six weeks ago. Since that I have heard from

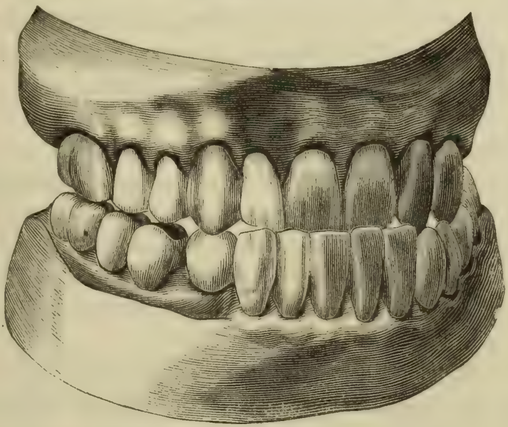
her two or three times, and am told she is getting along well. Fig. 3 shows the mouth with the apparatus in place.

The President. I can testify that this case is not exaggerated. Dr. Woodward showed me the mouth as you see it here, and asked me what I should do, and while I was thinking about it he produced the apparatus and slipped it on, and it was as you see it in the casts, a complete transformation.

Dr. Howe. Dr. Woodward did me the kindness to allow me to see this lady, and I take pleasure in testifying that there is no exaggeration at all of the articulation as presented in the deformed mouth, and that the restoration accomplished was very satisfactory. It is certainly a very remarkable case, both in its great deformity and in the restoration that was accomplished by Dr. Woodward.

Dr. Hawes. The case reported by Dr. Jarvie seems to be a very

Fig. 3.



interesting one, and I would suggest that it would be wise to have an examination of the mouth, if possible. I believe that a disturbed pulp is capable of doing almost any mischief.

Dr. Lord. I think that is an important suggestion, and I hope Dr. Jarvie will follow up the case, as I believe he intends to do.

Dr. Jarvie. My object in reporting the case was to get an expression of opinion upon it; whether there is the least likelihood that a disturbance of the pulp has brought about such a state of health.

Dr. Kingsley. I only beg of you that you do not get this case into the newspapers; we have had trouble enough already from patients talking about that *Times* article, and if this gets into the papers we will be bothered to death about it; people will think everybody is going crazy who gets a tooth filled, especially when it is filled with amalgam.

Dr. Clowes. That is one reason why I hope that Dr. Jarvie will follow this case up and ascertain, if possible, what the tooth has to do with the mania.

Dr. Jarvie. Is there any such case on record in the books? or has any gentleman present ever heard of such a case?

Dr. Dodge. I do not suppose any one believes that the man's tooth made him insane. Unusual things do not generally happen, and it is just within the outside limits of possibility that we may be going to learn that disturbance of the pulp can reach and affect the very center of life in this manner; but I join in the suggestion of the other gentlemen that Dr. Jarvie should follow the case up in all its details; not with a preconception that he is going to find some marvelous thing, but with the determination to be prepared to set forth, at some future day, all the details of the case. I do not myself believe for a moment that a thorough scrutiny will trace the mental disease to the filled tooth. The cause is too common, and the result too uncommon, to warrant such a theory, or for us to readily believe that that result would have escaped observation to this late day. I think it is quite as important to follow the case up for the sake of preventing people from being scared by the notion that filling a tooth may cause dementia, as for any other reason.

Dr. Howe. It appears to me that the physician ought to be the person to tell what the possibilities are in such a case; he ought to be better prepared to speak of the possibility of cerebral disturbance originating from an irritation of peripheral branches of any cranial nerve; he should be better acquainted with their anatomical relations to the cerebrum at their origin.

Dr. Dodge. If you want to find the greatest ignorance of all things related to dentistry, you will have to go to a physician.

Dr. Howe. I did not refer then to dental matters, strictly so-called. I referred to the anatomical origin of the fifth pair of nerves at the base of the brain, and the relation of the roots of this nerve to any portion of the cerebrum, which, being irritated, is capable of producing mental disturbance.

Dr. Francis. I would ask Dr. Howe what proportion of the physicians in ordinary practice he supposes make a special study of neuralgia.

Dr. Howe. I do not know what proportion of physicians make a study of neuralgia, and I do not know that that would have any special bearing on the point I refer to. I referred to the case of the gentleman whose mind was disturbed. We, a body of dentists, or, in the broadest sense, a body of medical men practicing dentistry, are asked about the possibilities of an irritation of the fifth nerve affecting the mind, which question seemed to me to be one for phy-

sicians—psychologists, perhaps,—to decide, rather than for dentists.

Dr. Francis. I must dissent from the opinion expressed by Dr. Howe, that physicians ought to know more than dentists in regard to the anatomy of tissues related to the teeth. I do not think that physicians, as a rule, give any more study to the anatomy of the head than dentists do. Many people possess the idea that a physician is infallible in his opinions and knows everything, but the fact is that they are just as likely to stumble as anybody. Many of you know that fact. I do not doubt that every dentist in this room, who has had an extended experience, has been called upon by physicians, in company with patients, to aid them in diagnosing cases of neuralgia, or pain in the head and face. Physicians certainly ought to know much concerning the nerves of the head and face, but that they know more about them than dentists do has not been shown by my observation.

Dr. Howe. Dr. Francis misapprehends my meaning. I did not refer to the anatomy of the nerve, but to the relation of its roots to the part of the brain that is concerned in mental operations. Pathological possibilities here seem slightly outside of the domain of our specialty.

Dr. LaRoche. I have a patient, a gentleman, who has been in the hands of the best physicians for a long time, and they have been treating him for disease of the brain. He came to me while in care of one of them, and I finally discovered that the trouble arose from the non-eruption of a retarded wisdom tooth on the left upper side. After I discovered that fact, he went to one of our prominent physicians, who told him to come back to me again and put himself in my charge. The gentleman was about twenty-seven years old at that time, and that led me to suspect something wrong with his teeth when I first saw him. Finally, after weeks of trial, I removed the above-mentioned wisdom-tooth. That was a year and a half ago. He came back last fall, and was attacked again with very severe pain. I found the gentleman could not get out of bed. Since that time I have taken out the lower wisdom-tooth and one of the twelfth-year molars. I then told him that I believed the best thing to do was to take out the other twelfth-year molar on the opposite side, which I did; and now the wisdom-tooth is making its appearance on that side. After I took out the first wisdom-tooth for him he was very much improved in health, and is in very much better health now. I have now another wisdom-tooth that I expect to get out. That case shows that the nerves may be very seriously affected by the eruption or disease of the teeth.

A Member. Was that gentleman insane?

Dr. LaRoche. He was very near it. He thought he would go

insane, and one of his physicians told me that he would unless relieved.

A Member. Will Dr. LaRoche tell us what efforts he was making for two or three weeks to get the wisdom-tooth out?

Dr. LaRoche. Yes. I had to wait until such time as I could get hold of it after taking out the twelfth-year molar. It was almost three months before I could get it out. I will give the society a full history of this case at some future time, with a history by the gentleman himself of his health and how he was affected.

Dr. J. W. Clowes then read the following paper, entitled "Oral Gardening:"

I shall essay to address you this evening on the cause, arrest, and prevention of dental caries. For many years it has been a pleasant fancy with me to look upon the care and treatment of teeth in the light of gardening, and I am greatly encouraged to continue this view of the subject by the astounding histological and physiological developments that have recently taken place. The germ theory of disease, with its fearful array of organisms, has come prominently to the front, and it is satisfactory to know that while the active forces evolved have immense capacities for sapping and mining and are the real power of demolition, *the acids, the alkalies, the new departure lightning, and the capillary engines are by no means set aside, but are permitted to occupy well-defined positions of co-operation.* Bacteria, leptothrix, micrococci, and the like, when adequately observed, are seen to be engaged in carrying away, comminuting, or crunching the dental constituents. An interesting paper in the *New England Journal of Dentistry* for November last, represents them as advancing in continuous procession and in countless numbers to the work of destruction! *They compose the grand army of the septic invaders, and before their might all flesh and bone must fail!* They are everywhere, in the air we breathe, in the fluids we imbibe, in the food we eat, and in the implements of mastication! I bow to the inevitable, haul down my personal flag of opposition, and, in the presence of this host, *close my eyes to the horrors of the situation!* I cannot afford to strain my own vision in looking after these germs, but am willing to trust those who have shown a laudable ambition in their discovery. My business at present is to name the causes of evil that are said to exist, and to do all in my power to render them harmless.

On a bright summer morning, many years ago, I moved to a house that had in its rear a large garden, in which, by the former owner, had been set a great variety of trees, shrubbery, and plants. The recollections of that garden, as I first beheld it, redolent of sweet

odors, and teeming with verdure and bloom, are among the happiest of my life. It seemed to me in the early June a miniature Eden, placed quite apart from the bustle and hubbub of the world! As the days advanced well into July, I was surprised and pained to see amid all this loveliness the shadow of a coming desolation! Wherever the eye might rest, scathing and shriveling, were sad reminders of the Diet of Worms! *Paul had, indeed, planted, but no capable Apollos had succeeded him to cultivate, care for, and water!* There was in everything a tendency to wildness. The thicket and the jungle were in course of preparation, and the inimical forces those conditions imply had come to possess them.

Does anyone see in this description a likeness to the average dentures of persons in the spring and summer-time of life? Irregularities of position, crowdings, overlappings, lateral impingings, surface depressions, enamel crevicings, and other catch-places and lairs of concealment—*are not these the fostering harbors amid which germs and organisms prolificate their kinds and lay waste the gardens of the mouth?* What did I do with my garden? I resolved to redeem it and to become master of the situation. It was an immense undertaking, to be sure, but I remembered "there is no obstruction to him who wills." My first move was upon the worms' nests, which I gathered together and gave to the flames. My next attack was upon the worms themselves, whether moving in masses or in skirmish lines, and wherever there was a hostile force of vermicular, chrysalis, or insectile form, I laid my hand upon it and—*it was not!* The first season I saved only my trees, bushes, and vines, but the blasters had been repulsed! When the spring came again I was early at my post. As the buds expanded and the tender leaves unfolded to the sun, the *early worms* also appeared. I had slain multitudes, but there was still an abundance of survivals. Intently I observed their processes of development and growth, studied their habits, means and methods of supply, and acted upon the knowledge gained until the victory was won! As the summer advanced, June became radiant with roses and odorous with perfumes. The apricot, the nectarine, the peach gave offerings of taste and beauty, and in autumn-time the varied fruitage of tree and vine, still sweetening by delay, filled the full measure of luxurious content.

In this broad land of ours how many oral gardens are in the thicket and jungle state, and hold within the countless myriads of the septic hordes? What are the chosen Apolloi doing to cultivate, redeem, and save? By one this tendency to wildness is sought to be restrained by a "positive system," so intricate, although so "easy," *as to be dreaded more than the wilderness itself.* In fact, the many pages of matter and illustration on this subject in the DENTAL COSMOS, have so *stirred* me

up that I fain would do something to lessen the necessity for employing so many and such ingenious devices. Another, through strange hallucination, applies the golden conserve with instruments of minutest point, by mallet-power, making thereby a metallic mince, an absorbing sponge, which, uncondensed and without burnishment, permits destruction sure to enter in. Another, while recklessly brave in the possible toleration of cadmium as a component of amalgam, outvies the aspen when, with trembling hand and thinnest file, he sets two teeth apart! Another, with great detective force indued, seeks out and finds the utmost limits of physical life, and then inanely stumbles when dentine and enamel employ his thought! Another disrupts from maxillary beds the teeth which later on he *dreams* he may restore! Another, with kindred attempt, explores the alveolar wells, digging and scraping to unseen depths for suppositious calculi, which upon removal are replaced by other and still other deposits of aborted nourishment! *This blight in oral gardens is nothing new.* The Preacher, long ago, defined its origin, progress, and results, the lack of nutritive and vital force, the "loosing of the silver cord" of connection, and falling away of the molars—the scarce audible "sound of grinding" and the stoppage of the mill! Nowhere for this evil does he encourage hopes of a cure. But in "remembrance of the Creator," he offers to "youth" the assurance of health to middle-age, its enjoyment on the way, and "by reason of strength," its continuance to the end. Another, when diagnosing a *casus mali*, goes tapping round on dental coronals in antiquated and most senseless ways, and finds out—nothing! Another, when suffering—pale, and wan, and weary—comes for relief, prescribes the disgusting leech, while for himself the light of heaven and of the nineteenth century streams down without illumination! Another, most industrious and persistent, becomes strained in his vision—sees in the banyan a upas, in the substantial a "vapor," and through mental inversion attempts a panic! Another, regardless of a long-tried and well-deserving humanity, with penetrating screw abstracts the dental pulp yet palpitating with the pulse of life! Another, forgetful of the past, and blundering still, halts his ambition at the sewer's mouth, and gives pollution vent beneath the festooned gums! Another, with arid brain, goes daft on dryness, and by excess makes a "good thing good for nothing!" Another—ah, no—but many toilers in oral fields are markedly hesitant and irresolute on the subject of *cutting enamel and dentine.* Some of these are so averse to this act that they declare their preference rather to permit the loss of their patient's teeth than to save them by such means. *An abatement of this folly can only come through common-sense!* Instead of being a cause for deprecation and fear,

no dental operation can be more trustworthy and useful. *By this alone, if timely and skillfully done, almost any set of teeth may be preserved from approximal decay.* This declaration is not of a theory but of a practice which many years and much labor have established and confirmed. There is a class of oral workers (combined with physic) so limited in numbers and in comprehension as scarce to deserve intelligent regard. *These are they whose founder long time ago declared his ignorance of the thing his fatuity condemned!* Given to panic-making and false alarm, the method in their madness secures, through gratuitous notice in the daily papers, an unchecked license to worry and torment their scared victims of attack. Amalgaphobia is the name of their affliction and the definition of their sect.

A truce to this.

Cobbles and undergrowth evince a lack of care, while cultivation true is shown in harvest yields! In my Eden redeemed the fruits were abundant and the enjoyment full. What then was the magic spell that rested on desolation and made it enchantment? *No word and no act having reference to that garden, no word and no act regarding the gardens of the mouth, is greater, grander, and more puissant for good than* SEPARATION! *By it the dense thicket was laid open to the light; the intricate maze of interlacing branches gave admission to the sun; the transit of the all-pervading air was free, and antagonisms ceased!* Dental culture is a necessity of civilization, regularity and room the concomitants of safety, and loss must be the precedent of gain. The noblest saving comes through sacrifice, but minds unbalanced through mistaken zeal work immolation, to the world's great loss!

"Take two examples to our purpose quite." Earnest in action and pure in motive, Varney and Webb—I name them reverently—were martyrs, glorious martyrs, to a false conception of the highest good. The hapless idolatry of the juggernaut of gold crushed out their lives and all too soon they perished by the way! A better comprehension and more eclectic views of means and ends had well sufficed to keep them here in the useful service of their fellow-men! The highest professional aim, the most beneficent ideal that may possess the dental mind, is PREVENTION OF DECAY. *In its accomplishment regularity of position and avoidance of contact are especially involved.* By way of illustrating my system of establishing these and cultivating the oral garden, I begin with a child's teeth at the age of three and a half or four years. When the first denture is well in place, with Arthur disks, appropriate files, chisels, and burs, I thoroughly separate the teeth and maintain that condition by the approximal arch and lingual bevel. *At this early age separation anticipates approximal decay, and then mastication alone secures continued soundness until the shedding time.* The next important act in the process of

cultivation is cutting out all enamel imperfections from the deciduous crowns and filling them with amalgam. Here for a time I rest. About the sixth year important events occur, and the drama of change begins. The first to fall out of line are the lower central incisors, fast followed by their correspondent teeth. While these are taking leave, their permanent substitutes arrive, and *back of all, quite unobserved, four memorable molars come. These are nominated well from their period of eruption and, by reason of inherent weaknesses, should have our earliest care.* And now the lower and upper permanent laterals appear, *rearing* quite likely on those they should replace. *When this is so, extract the temporaries and let the permanents come in.* If still sufficient room has not been gained *the deciduous canines must be removed.* Doubtless, in reference to these teeth, you have been told not to extract, *but allow nature to make her own correction. Unfortunately she lacks the power*, and calls on you for a helping-hand. *If you prove recreant here, the future will have no excuse sufficient for your fault.* Having surmounted this dental and professional bar you soon will see the permanent laterals beautifully placed. Again we rest, and well we may, for excitement from inhibited acts has been intense and the strain severe! The work of regulating should be resumed by extracting, *if necessary*, the anterior first molars when the permanent canines have pierced and are well projected through the gums. About this time the bicuspids arrive and the business of second dentition will be rapidly forwarded by the absence of the posterior first molars. *The especial intent of these directions is that no permanent tooth shall be kept back or become awry by reason of any deciduous obstruction.* Time has passed, and the mouth, so small when first opened to our view, has expanded with the years,—in number twelve,—and with them have come *four molars more; all others precedent, these rear on all and make contaction imminent.* In this garden of our care a *crisis* is at hand. Shall we meet it manfully and win, or by *irresolution* miserably fail? *For many years I have wrestled with the problems of irregularity and contact, and the sum and attainment of an earnest professional life impels me to declare the extraction of sixth-year molars a legitimate and rational practice in the highest degree.* Upon their *timely* removal the most rigid lateral pressure will relax, expansion and regularity ensue, and the middle molars, advancing with ease, will gracefully assume their vacancies. Sixth-year molars are not always the ones to be removed. *The period at which we act and existing conditions must determine that.* Except for impairment by disease or poverty of structure *the bicuspids should be, as a general rule, exempt from extraction.* Their loss brings but little relief from crowding, and the gain in maxillary space will not be equal to the healthful placing of nature's final reserves. While these develop

beneath the gums, and unseen tendencies impel their progress, we rest again and view the cultivated field.

In due time and order the promised complement arrives and makes the dental measure evenly and comfortably full. The teeth, in wisdom sent, claim attention, and when this is bestowed *our* necessary labors cease.

(To be continued.)

DENTAL ASSOCIATION OF MARYLAND AND THE DISTRICT OF COLUMBIA.

The next annual meeting of the Dental Association of Maryland and the District of Columbia will be held at Baltimore, Md., beginning Wednesday, October 24, 1883.

H. M. Schooley, *Secretary*,
1215 Pennsylvania Ave., Washington, D. C.

BIBLIOGRAPHICAL.

Die Kiefer fragmente von La Naulette und aus der Schipka-höhle als Merkmale für die existenz inferiorer Menschenrassen in der Diluvialzeit. Von Dr. Robert Baumé. Arthur Felix, Leipzig, 1883.

The author of "Odontologische Forschungen" is one of the most industrious of men, as well as one of the most persistent of investigators. The ink is scarcely dry on the review of that work, when we have presented to us a monograph of 46 pp. on the "Bone Fragments of La Naulette and the Schipka Cave." The preface will sufficiently explain the history and scope of the work:

"There exist two fossil fragments of the human inferior maxilla, from the stone age, and cotemporary with the mammoth. The first was found in Belgium and the second in Mähren. Both fragments agree in many respects in which they differ from all other human inferior maxilla. These deviations are, therefore, regarded as peculiarities of race, and have become the subject of lively discussion. The interest is an unusual one, because these fragments remind one of the quadrumana. This, together with some views advanced in the course of the discussion, induced me to publish the following work. I am indebted, with great thanks, to Profs. Maschka and Virchow. The first gave me his valuable preparations for some time to study, and the latter had the goodness to loan me plaster models from the original in Brussels. I am, therefore, in the position to form a careful judgment from my own observations.

"Through the kindness of Prof. Peters, Director of the Zoological Museum of the University of Berlin, I was able to compare the details of all the skulls of anthropoids in his collection. In a similar manner, Prof. Nehring, Director of the Zoological Collection of the Agricultural High School in Berlin, placed material at my disposal. Shortly before the printing Prof. Schaaffhausen sent me his reply to Prof. Virchow's statement, but I, nevertheless, am of the opinion that my work has not become unnecessary, and I will not, therefore, hold it back from publication."

The author then enters into a minute description of the jaw of La Naulette and that from the Schipka cave in Mähren. It is impossible to follow him in his exceedingly interesting investigation of these fragments, as to do so would necessitate a translation of the entire work, and we must, therefore, be content with the conclusions arrived at.

"In concluding, I sum up what appears to me to be of importance in the two diluvial jaws:

1. The actual proof of the existence of human races in the diluvial period, which, in reference to the formation of the inferior maxilla, differed markedly from all living forms. These facts stand in contradiction with the conclusions of the anti-Darwinists, that there has been no change in the races since the tertiary period.

2. The possibility of recognizing a lower position of that race of men in characteristics shown in the formation. The investigations demonstrate that in the diluvial period, human races lived, notably inferior to the low grades of men to-day."

The work is a valuable addition to the literature of human remains, from the hands of one thoroughly competent to perform it.

T.

Zahnarztliche Mittheilungen aus der Chirurgischen Universitatspoliklinik zu Leipzig. Von Jul. Parreidt. Leipzig: Verlag von Arthur Felix, 1882.

The author of this is well known in German dental circles as an able contributor to the "*Vierteljahrsschrift*," and its successor, the "*Monatsschrift*." As an author his hand-book of mechanical dentistry, and enlargement of Richardson's, is probably his most important work.

In May, 1876, he was appointed dental assistant in the Surgical Polyclinic in Leipzig, and this report covers his observations and practice from 1877 to 1881. These are principally confined to pathological cases, very few of a practical character being described, as this part of dentistry seems not to be regarded of importance in this institution.

The polyclinic is open daily, from 11 to 12 o'clock, for the reception of patients. Over 3,000 are treated in the course of the year. This the author regards as sufficient reason for neglecting practical operations. It would seem to the writer that a large proportion of the operations must prove failures and entirely useless as a means of instruction to students, unless accompanied by filling, etc.

The report of the cases and treatment is interesting and instructive, and is worthy a place in the library of every German practitioner for reference and comparison. T.

ANATOMY, DESCRIPTIVE AND SURGICAL. By HENRY GRAY, F.R.S. With an Introduction on General Anatomy and Development, by T. HOLMES, M.A. Cantab. Edited by T. PICKERING PICK. A new American from the Tenth English Edition. To which is added "Landmarks, Medical and Surgical," by LUTHER HOLDEN, F.R.C.S., with Additions by WILLIAM W. KEEN, M.D. With 564 Illustrations. Philadelphia: Henry C. Lea's Son & Co., 1883. Price, cloth, $6.00; leather, $7.00; half Russia, raised bands, $7.50.

The English editor, in his preface to this tenth edition of Gray, states that several portions, especially in the sections on microscopical anatomy, have been considerably altered or entirely re-written, in order to keep pace with the ever-increasing activity of research in this branch of the science of anatomy. Several new illustrations have been added, and some of the old ones have been replaced by others from improved drawings. The American edition has been supervised by Dr. R. J. Dunglison, and a few illustrations have been inserted by the American publishers. The addition of Mr. Holden's "Landmarks, Medical and Surgical," contributes very much to the convenience and value of the volume.

This work is without a rival. It follows as the night the day, that to lack Gray is to be without an "Anatomy."

A COMPEND OF SURGERY FOR STUDENTS AND PHYSICIANS. By ORVILLE HORWITZ, B.S., M.D. With fifty illustrations. Philadelphia: P. Blakiston, Son & Co., 1883. Price, cloth, $1.00.

This volume is the ninth of the series of Quiz Compends, the previous numbers of which have been already noticed in these pages. The one before us is a concise and comprehensive presentation of the subject indicated by its title, compiled and condensed with evident care from the standard authorities on surgery. Under seventy-four headings, with numerous divisions, almost every important surgical subject is defined, and symptoms and treatment outlined.

OBITUARY.

Dr. THOMAS L. BUCKINGHAM.

DIED, at his residence, in Philadelphia, on Tuesday, Sept. 4, 1883, Professor Thomas Lea Buckingham, M.D., D.D.S., in the sixty-eighth year of his age.

The announcement of the death of Dr. Buckingham, although not wholly unexpected, will be received with sincere regret by the wide circle of friends to whom his estimable personal qualities had endeared him. During the late meeting of the American Dental Association his feebleness, so contrasting with his former vigor, gave token that he was seriously ill, and justified the fear that the end was not far off. Decided symptoms of disease were observed about the middle of July, but he determined, notwithstanding, to attend the meeting of the association with which he had been so long identified. He did so, taking an active part, and speaking on several occasions. On arriving home he went to Atlantic City, in the hope of benefit from the sea-air, but was compelled to return again to Philadelphia in a few days, without perceptible improvement. From this time onward the symptoms became graver as the days passed. Progressive paralysis set in, and death—peaceful and painless—was the result.

Dr. Buckingham's connection with dentistry began only four years after the establishment of the first dental college, and for the last thirty years he has occupied a prominent position and been an active participant in every movement for the advancement of his profession. He was not of those who dazzle by the brilliance of their achievements, but he was a steady, conscientious worker, bearing his share of the burden, and doing his duty as it came to him. At the time of his death he was probably the oldest teacher of dentistry in continuous public service in the world; having received his first appointment as professor of mechanical dentistry in the old Philadelphia College of Dental Surgery, in 1852, since which time he had not failed to deliver a regular course of lectures every winter.

Dr. Buckingham was the eldest son of James and Mary Oliver Buckingham, and was born at Hackleburney (now Kiamensi), Delaware, March 9, 1816. His father was a miller, who, after giving the son a common-school education, placed him in the mill to learn the business. After the death of his father, which occurred when the subject of this sketch was nineteen years of age, young Buckingham carried on the mill for a year or so, when he became a farmer. He was engaged in farming for several years, during which time

(in 1841) he married Miss Ann Rubencame. In 1843 he removed to Wilmington. There he entered into the dry-goods business, but soon relinquished it, and began the study of dentistry in the office of Dr. Andrew C. Reynolds. It is related that he had been with Dr. Reynolds but a few days when he was left in sole charge of the office for some weeks, his natural mechanical ability standing him in good stead. He afterwards practiced for a short time as a traveling dentist, but in 1845 he settled in Philadelphia, where the rest of his life was passed. He first formed a co-partnership with Dr. Lee. This connection ceased in 1846, and Dr. Buckingham began practice on his own account. In 1852 the Philadelphia College of Dental Surgery was inaugurated, the first session commencing in November of that year. Dr. Buckingham was a member of the original faculty, and occupied the chair of Mechanical Dentistry during the four years of its existence. In 1856 this institution was succeeded by the Pennsylvania College of Dental Surgery, of which Dr. Buckingham was one of the founders. He was at first called to the same chair in the new college that he had occupied in its predecessor, but in 1857, he was transferred to the chair of Chemistry, which he held continuously to the time of his death. He was dean of the faculty from 1857 to 1859, and again from 1865 to 1871, the duties of the position including, also, those of secretary and treasurer.

Dr. Buckingham was graduated in medicine from the Philadelphia College of Medicine, in 1851, and he received the degree D.D.S. from the Baltimore College of Dental Surgery in 1853. He took part in the organization of the Pennsylvania Association of Dental Surgeons, with one exception the oldest dental society in America, though he did not become actively identified with it for two or three years afterwards. He was president of the American Dental Convention in 1860, and of the American Dental Association in 1874. He was also a member of the Odontological Society of Pennsylvania, and of other societies. He took a warm interest in the societies with which he was connected, frequently contributing papers, and engaging actively in the debates, for which he was well fitted. He was also one of the promoters of the *Dental Times*, and was a frequent contributor to its pages during the ten years of its publication.

He was a man of excellent mechanical ability. The apparatus which he used in his lectures at the college was almost entirely of his own construction. He was the inventor of the first mallet used with the dental engine, and his talent in the direction of invention was further shown in various other devices. He was a skillful mechanical dentist, to which branch his energies were largely devoted. His reputation, however, rests chiefly on his services as a teacher. He

had the happy faculty of illustrating the driest theme with a homely simile that made clear the point he wished to enforce to even the dullest comprehension, and by its very homeliness fixed it indelibly upon the mind. He was a genial and kindly man, and these traits, carried into the class-room, gave him a popularity with the students which aided not a little in his success as a teacher.

Dr. Buckingham's character may be summed up in a few words. We have already said he was of a genial and kindly nature. He was moreover unselfish and generous; no dentist or student ever asked him for information which it was in his power to give that was not freely imparted. He was slow in forming his opinions, cautious in accepting new theories; took nothing for granted, but wanted the proofs; when his mind was made up, having as he thought considered all sides, he was as tenacious of his judgments as he was careful in forming them. He was a self-respecting man, and in all the relations of life the type of the good citizen. He leaves behind him the record of a long and honorable service, and when the roll of those who have contributed to the rise and progress of modern dentistry is made up, the name of Thomas Lea Buckingham will not be last.

At a special meeting of the corporators of the Pennsylvania College of Dental Surgery, held on Monday, September 17, 1883, the death of Thomas L. Buckingham, M.D., D.D.S., was announced.

A committee, consisting of Drs. S. D. Gross, Ellerslie Wallace, and J. DeHaven White, submitted the following resolutions, which were unanimously adopted:

Whereas, Dr. Thomas L. Buckingham, a member of this body and of the faculty of the college, having been removed from among us by death, it is fitting that we should make record of the event, and of our sense of the loss thus sustained; therefore,

Resolved, That by his honorable character and genial disposition Dr. Buckingham won the esteem and affection of his associates, and by his long-continued and conscientious labors as a teacher and practitioner endeared himself to us as a respected and honored friend.

Resolved, That in his death the profession has lost a valued member, and this college one of its earliest and most steadfast supporters.

Resolved, That we tender to his bereaved family our heartfelt condolence, and that a copy of these resolutions be forwarded to them, and to the Dental Cosmos for publication.

David Roberts, *Secretary*.

HINTS AND QUERIES.

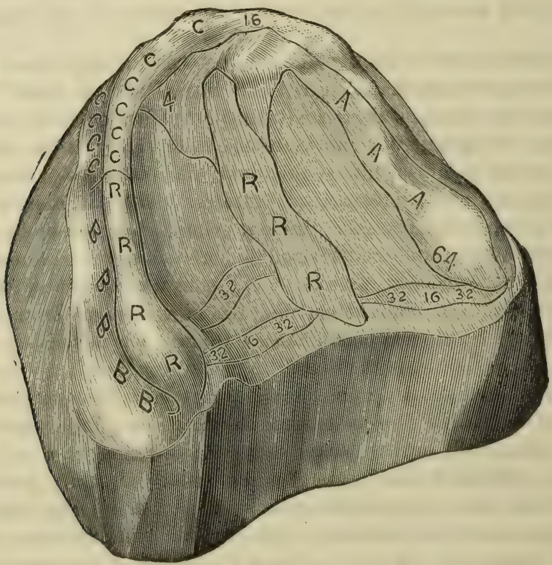
ARTIFICIAL DENTURES.—Mechanical dentistry, so-called, has been allowed to fall almost to the level of a mere mechanical occupation. Manufacturers of dental supplies are expected to furnish the required articles, so as to save the dentist from the necessity of having or exercising any taste or judgment. Even the dental colleges have allowed this branch of dentistry to occupy such a position that its very name is made repulsive to the student. The student, like a majority of the public, when he first enters the dental office, imagines that the most important part of dentistry is the insertion of artificial teeth. Learning later, however, that the most valuable service rendered by the dentist is the saving of natural teeth, he decides to be an "operator." When he enters college this idea is encouraged by the professors and coincided in by his fellow-students, who are, in fact, all going to be operators. Soon the insertion of artificial dentures comes to be considered as beneath professional dignity. After graduation he quickly learns that to secure a position as assistant he must associate himself either with one of the thriving establishments devoted to the extraction of teeth, and their substitution by porcelain, or with a so-called "first-class dentist," who is an operator—a first-class operator who is also a first-class mechanical dentist being of the past. Because of this fact, the public are virtually turned over to the "cheap Johns" when prosthetic service is required. How can it be otherwise, when professors do not care to teach it, the student despises it, and the profession considers itself above it? If the preceptor in his office and the professor in his chair are alike neglectful of the requirements in the direction of substitution of artificial dentures, what can the public do but patronize the very men whose slaughter and botchwork they denounce? Certainly, every graduate should be thoroughly educated in what is termed mechanical dentistry, as well as in what is denominated operative dentistry; nor should he feel himself at liberty to neglect either branch in his practice, unless the circumstances of his locality justify him in electing to follow one to the exclusion of the other.

With these preliminary remarks, I propose to offer a few suggestions which I hope will prove of practical value to those who, engaged in prosthetic dentistry, believe that whatever is worth doing at all is worth doing well. To secure good results in an artificial denture, a correct impression is first in order and first in importance. Plaster of Paris is, in our estimation, the only material with which a normal impression can be obtained. The various other materials used for the purpose force the muscles and soft tissues out of position, resulting in an inaccurate cast. Having secured a normal impression,—the negative from which a positive is to be obtained,—it should be considered as representing merely the outlines; the conditions to be noted after a careful study of the parts. With the patient in the chair and the cast in hand, the conditions may be indicated by a series of characters and figures penciled on the cast. For instance, the thickness of the tissues may be represented by figures 64, 32, 16, 8; the sixty-fourth, the thirty-second, the sixteenth, and the eighth of an inch in thickness. *F*, will indicate flexible; *R*, ridged, etc. With such a record an intelligent idea can be formed of the requirements in the particular case, and the necessary modifications will be easily comprehended and accomplished; the adaptation to the hard and soft, rigid and flexible, parts secured; the pressure obtained just where wanted—most in the soft parts, and least in the rigid. In order to trim a cast judiciously, one must have a thorough understanding of the individual mouth. A very important con-

sideration is to so conform the plate to atmospheric pressure principles that in its use the soft parts of the mouth will be molded by the denture. The movements of the tongue and the direct pressure of the lower jaw contribute largely to bring about this result. The fact that the mouth does thus conform to the denture shows the importance of a careful preparation of the cast, in order that pressure may be brought to bear where it is most efficient and least distressing, and to secure atmospheric pressure in establishing adaptation and retaining the plate.

The surface of the plate should always be finely finished; a rough and uneven surface prevents nice adaptation, and is unclean and unhealthy. With air or any foreign substance between the denture and the surface of the mouth covered by it, perfect contact is prevented. If both rubber and celluloid plates were more highly finished before insertion in the mouth, there would be less complaint of these vegetable bases for artificial dentures.

At the level of the sea the atmospheric pressure is said to be fifteen pounds to the square inch, but no such amount of pressure is required to retain a properly fitting artificial denture. The saliva or fluids of the mouth are also of great im-



portance in retaining a denture in position. If the plate and mouth were made perfectly dry, it would not be easy to secure such adaptations as would be required to hold the plate in position. The utility of the atmosphere is not, however, fully demonstrated in the retention of a plate until an air-space is created by means of of an air-chamber. This air-chamber should cover at least four-fifths of the palatine arch, and include certain parts of the alveolar walls. With this provision and a judicious trimming of the plaster cast on the outer portion of the alveolar ridge, a large part of the denture is made to act as an air-chamber, and this should be understood as but a temporary means in assisting the mouth to conform more readily to the denture; the result will be vacuum by complete contact, which does not take place until all the air is excluded, and the air-space filled up by the mouth conforming to it.

To insure a comfortable adaptation, the pressure must be so equalized that, as the alveolar ridge recedes, undue stress will not be brought on the hard palate. For this reason an air-space, covering almost the entire surface of the palatine arch is desirable, as thus the pressure is better distributed and brought to bear directly on the alveolar ridge, where there will be the least danger of injuring the mouth, and thus avoiding the riding or rocking of the plate on the hard palate. The conventional air-chamber, with its acute angles invariably placed on the most rigid portion of the hard palate, soon outlines itself in the tissues, demonstrating a failure to properly utilize atmospheric pressure, and injuring the mouth by inducing absorption unnecessarily.

The illustration is an exact copy of a mouth for which I am now preparing a set of continuous-gum teeth. The conditions may be indicated by letters *A*, *A*, *A*, 64, 4, meaning that within these outlines the tissue is about the sixty-fourth part of an inch in thickness at one end and one-fourth of an inch at the other; *R*, *R*, *R*, very rigid; *C*, *C*, *C*, 16, the one-sixteenth of an inch in thickness; *B*, *B*, *B*, very sensitive to pressure; 32, 16, 32, mean parts of an inch in thickness. On the side *A*, *A*, *A*, a large piece of the process had been torn away in extracting the first molar, which accounts for its peculiar condition.—C. H. LAND, *Detroit.*

IS PULP-AMPUTATION CORRECT PRACTICE?—A few days since a lady came to me to have two gutta-percha plugs replaced with gold. One was in the left upper cuspid, the other in the right upper first bicuspid. On inquiry as to their history, she told me that the dentist who put them in had tried to kill the nerves in both teeth; that he had made several applications, had hurt her severely, and had finally given up, and put in "temporary" fillings. They had been there over two years and had given her no trouble. On removing the gutta-percha, I found the roots filled with cotton, and under this, in both cases, the fragment of a live nerve, sensitive to the touch of an instrument, cold water, and cold air. Neither fragment could have been longer than one-third of the length of the root.

Amputation of the pulp has been advocated, but it has never been indorsed by the profession as a justifiable operation, but here were two *fragments*, to which arsenic had been undoubtedly applied, and which had been subjected to much unskillful handling, still living at the end of two years. I presume all dentists (except those who *always* succeed) have experienced difficulty in occasional cases in devitalizing pulps, and have found after even an unusually protracted treatment some life left at the apex of the root. I know many claim that the feeling of pain at the apex does not indicate living matter in the root-canal, but that it is caused by the pressure on the nerve exterior to the root of a column of fluid, air, or débris pushed up by the instrument. This may be true sometimes, but I am strongly inclined to suspect a live fragment of nerve-tissue in the canal when a *fine* instrument produces pain before reaching the apex.

Is our treatment of these fragments correct? Ought we to push them to the last extremity when they show recuperative power, or, at least, tenacity of life? How do we know that a fragment that lives for a month, because some patient failed to return for the final application, will not live for years?

Members of dental societies have frequently stated at their meetings that *they* never apply arsenic but once, and the pulp dies, root and branch. I can't do that. It is true I do it accidentally once in a while, but usually I find in the small canals a tenacity of life after the main portion of the pulp has been destroyed.

I should like to hear others give their experience in opening root-canals. Most of the society discussions about removing nerves and filling roots are like those

about capping pulps, from hearing which a listener would imagine that the operator was capping a pulp as large as an anvil, in a cavity as big as a wash-tub, and using a mush-paddle to do it with. It is so easy!—A. Morsman, M.D., D.D.S.

Iodoform.—At the annual meeting of the Pennsylvania State Dental Society at Cresson Springs, July, 1883, Prof. James Truman read a paper on the "Therapeutic Use and Influence of Iodoform." To this paper and its author I am indebted for one of the most efficient agents in the alleviation of pain from an inflamed pulp that it has been my good fortune to hear of. The objection to the employment of iodoform has been its persistent and unpleasant odor. In order to overcome this, I had a small quantity of the drug ground up with equal parts of oil of cloves and oil of eucalyptus, forming a substance of a soft, cheesy consistence, of which the required portion can be readily taken from the bottle upon the point of a small broach and carried directly to the inflamed part. Its application in this manner to three inflamed pulps within the last week has been attended with the most happy results. The history of the uses of this agent by Prof. Truman will be read with interest, and the profession will certainly be obliged to him for calling attention to a remedy of so much importance, but which has been so little used by the dental practitioners in this country. Without entering into a discussion of the properties of iodoform, it is evident that it acts as an anodyne or local anesthetic as well as an antiseptic. Where arsenious acid is indicated for devitalization, it may appear that iodoform, combined with the arsenic and creasote, while not interfering with the devitalizing influence of the arsenic, would by its anodyne property somewhat lessen the pain which so frequently follows the application of the arsenical paste. I have had the opportunity of using this combination but once, and have therefore no experience worthy of recital.—C. N. Peirce.

Chloride of Ammonium in Peridental Inflammation.—The primary effect of chloride of ammonium is that of a stimulant; its secondary effect, that of a resolvent, together with a tonic action. In large or frequent doses it produces purging. It has long been recommended in inflammation of the serous and mucous membranes, and also as an efficient remedy in nervous headache, neuralgic affections, as tic douloureaux, sciatica, neuralgic dysmenorrhea, and toothache. I wish to call attention to its value as a remedy in toothache arising from inflammation of the peridentium. I have found that in the stages preceding suppuration a dose of from seven to ten grains, given every twenty minutes, will give a relief that is almost surprising. It is seldom that more than a second dose is necessary. I have carried over cases of periodontitis with this drug for an indefinite length of time, or until surgical treatment would be more expedient. It can be administered alone, or, to destroy its pungent taste, combined with mint-water, syrup of orange-flower, or extract of liquorice. The extract of liquorice makes a very pleasant and agreeable addition, and prevents irritation of the stomach. The formula I prefer is:

℞.—Ammonii chlorid. gr. xx.
Aquæ, f ℥j.
Ext. glycyrrhizæ, ʒj.

M. et. sig. Tablespoonful every twenty minutes.

In persons who are suffering from malaria or from depression from any cause in connection with periodontitis, the systemic condition being such as to abort all local remedial efforts, a few doses will give tone to the system, permitting the mechanical treatment and filling of the tooth.—S. B. Luckie, Chester, Pa.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

ECLECTICISM AND THE EXTREMISTS.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

It is the peculiar weakness of all special schools of medicine, so called, that the practice of their tenets requires the exclusion of very many remedies, materials, and methods of treatment which the extended experience of the profession at large has demonstrated to be useful and valuable in their proper places. Indeed, many things are abandoned and denounced by the followers of some of these special theories of practice which are utterly indispensable to the successful cure of many maladies. Such follies but invite the scorn and ridicule of all enlightened practitioners. Impracticable ideas, and the vagaries of demented enthusiasts and fanatics, lead to a sectarianism in medicine as absolute as it is in religion. The leaders and teachers of peculiar tenets must make their working capital out of the abuse of and opposition to some established method of practice, or the denunciation of some standard remedy. For instance, one school condemns the use of all preparations of mercury. They contend that it is only and forever fruitful of evil and injury to mankind, and denounce it in the bitterest terms as being the cause of most constitutional diseases. Another school condemns the use of quinine in doses sufficient to make an impression. They claim that it is poisonous, that it "saturates the bones" and "creates the malarial diseases it is given to cure," and that its reckless administration by "allopathic" physicians has led to self-prescription by innumerable "victims," whose degrading "quinine habit" can only be compared to the opium habit or alcoholism! Another school uses only vegetable remedies, believing that all the ills of mankind result from the use of mineral drugs; and still another believes that all necessary therapeutics lies in the proper employment of water in its various forms and methods of application. Thus, the teachings

of the various medical sects, when followed out to their legitimate conclusions, or when let loose with the fanatics in the lead, tend inevitably toward absurd and dangerous extremes. They show how otherwise intelligent people may have insane notions on some one particular subject. They also exhibit the dangers of yielding to the temptation to run to extremes, and the necessity for the intelligent man being ever on his guard against the vagaries of special schools and the wiles of visionary enthusiasts. It requires an effort for him to keep in the path of rectitude—a safe and intelligent eclecticism. Like the Christian in his warfare against the adversary of souls, he must "watch and pray," for the devil, in the form of a special-school theorist, is liable to come "like a thief in the night" and steal away his senses while his judgment sleepeth. But through all temptation he must resist, to the end of attaining and preserving the greatest degree of efficiency and usefulness.

But schisms and the development of special schools are some of the inevitable results of the attainment of extensive acceptance and importance, and the employment of numbers of thinking men,—by any system of philosophy, religion, or science. Sometimes sects secede from the common parental household and set up for themselves; sometimes they remain to keep things in a turmoil. The variation among human minds must inevitably lead to variety in systems of beliefs. All the learned professions have their conflicting specialties and schools. The dental profession is no exception to the rule. It has had its schools and theories of beliefs in principles and practice in the past, and in the struggle for existence some have perished and some have survived to mold the dental profession of to-day, which bears the marks of their influence and teachings. As a rule, the fittest survived and the worst went to the wall. But the profession of to-day is the field of a conflict, the magnitude and importance of which dwarfs everything it has ever passed through before; and the controversy is, to some extent, the legacy of other days. We refer, of course, to the struggle for supremacy and dominion now existing between the *plastic* or "New Departure" party and their opponents, the *gold* or *Esthetic* party. These names are descriptive of the leading tenets or dogmas of each school, which refer to the selection of materials to be employed in that greatest and most absorbing occupation of the dental profession, the saving of carious teeth.

The uncompromising opposition of the teachings and teachers of these two schools of therapeutics has led to the definite separation of the profession into two well-defined parties, which may be conveniently and aptly compared to the two principal parties in politics, to which they bear more than a passing resemblance. The

plastic party, for instance, is like unto—indeed, is analogous with—the *republican* or *liberal* political party of European and American nations. It resembles it in being ever progressive, aggressive, and revolutionary. It is the party of reform, of agitation, of experiment, of invention, and of change for the sake of change. It is perpetually seeking to discover something new, and if possible something startling, in theory or practice. It is prodigal of energy in the cause of reform and change. After some years of aggressive missionary work, it claims to have accomplished wonders in the cause of revolutionizing methods of practice. Perhaps this is true, perhaps not; but it is certain that as regards the moral and practical results of this tremendous innovation and agitation, there is still a very great quantity, variety, and conflict of opinion. If the supporters of the theory are charged with occupying untenable ground, and that their theories are impracticable, they refer to what they call their results and their records; and *the conflict to-day is upon the question of the reality of these results.* The plastic advocates have staked their all upon the verdict of these results, and being committed to the test, by it their hypothesis must stand or fall. Their claims of what they have accomplished are high. They are to the effect that the dental profession is now thoroughly inoculated with the New Departure principle,—or heresy, as you please,—and that from this time forth our body politic, from nucleus to periphery, is a changed organism. They claim also that the plastics will hold the balance of power, and because of the spread of the belief in the doctrine that "materials other than gold for preserving some teeth are better than gold," and that, "in proportion as teeth need saving, gold is the worst material with which to fill them," that tooth conserving will be more extensively practiced. But their claims, like their theories, are staked upon the verdict of the results.

The opposition party in dental therapeutics is the *all-gold* or *Esthetic* party, who are necessarily the conservative faction, truly so called, and who are exactly analogous to the conservative party in politics. The object of the being of this party and its one ambition is to maintain things in *statu quo;* to preserve institutions, customs, and practices as they found them, and to transmit them unimpaired to posterity; to continue to do things as the fathers did them, without variation, because the fathers so did them; to honor, preserve, and hand down the traditions, and in all things and at all times to oppose and obstruct innovation and change. They look suspiciously upon new things because they are new. They fear to try them because they might be tempted to commit the sin of breaking with the traditions. What was good enough for the fathers is good enough for them. They thus cling to gold and abhor the

plastics,—the plastics meaning amalgams almost entirely. This material has to them an unsavory history ever since the days of the Crawcours and the deadly struggle in which the old American Society of Dental Surgeons went down. Because of this predilection for gold and their artistic productions with it, they are in claim and in fact the esthetes of the dental profession and practice high art. Theirs is the gospel of beauty for the sake of beauty. Like a late self-appointed emissary of the social esthetes to this country, they teach that "beauty is enough and beauty can do no wrong." The traditions dwell upon the superiority of gold and the superb operations which the masters performed, and the esthetes of to-day rightfully lay claim to a proud lineage, reaching back to the masters. This ancestry constitutes them the aristocracy of the profession and creates a caste. And like the real aristocrats and monarchists in politics, they dread and persecute plastic republicanism in all its forms, seeking to crush the hydra-headed monster as it ever rises to new life. They look upon the plastic rebels as being revolutionary, iconoclastic, and nihilistic, aiming to destroy the very foundations of operative dentistry and bring it into irretrievable ruin and disgrace. They are, again, the party of culture, as well as of conventionalism, and believe and teach that gold only is fit to preserve teeth, and that the plastics—meaning amalgam—are polluting to the touch and degrading to the profession. They hold that the plastic gentlemen condemn gold not so much on account of a few real evils accompanying its use as because of many fancied ones; and that their objections arise more from inability to manipulate it, and indolence aud aversion to labor, than from any intrinsic and real objections to gold as a filling-material. Gold has been in use for generations for preserving teeth, and they point to the results of its employment in many cases with pardonable pride.

Through the opposing and conflicting opinions and beliefs of these two parties, it comes about that the operative ranks of the dental profession to-day are divided into two distinct camps, who are at swords' points on the subject of the selection of materials for filling teeth. These two schools in our profession are like the various schools and sects of medicine, and like them the fierce and uncompromising advocay of extreme tenets has necessarily carried each one to the promulgation of inexpedient doctrines. And, as usual, there is right and wrong on both sides. The extremists in both camps are committed to impracticable conclusions, but the moderates in both camps come very near to meeting on a safe middle ground, and, but for the belligerency of the leaders, they might effect a compromise. But it so happens that all men and all factions, no matter how wild and impracticable may be their theories or ideas, consider themselves the

true eclectics; that *their* principles and practices alone are truest and best, and that they, by a sort of divine right, hold the keys to perfect discrimination between right and wrong. There is no radicalism too radical, no conservatism too conservative, but that its advocates claim that it is above question right, and that the goal toward which it leads is ultimate and absolute perfection. This obtains because few men are capable of looking beyond their own restricted horizon and seeing and comprehending what is without the pale of their own narrow, prejudiced vision. Man by nature is not so wicked as he is stupid. He cannot see and will not admit of illumination. In this prejudice and stubbornness lies the cause of all the conflict and persecution for opinion's sake which the world has seen, and of the most flagrant cruelty and injustice which history has to record.

The controversy in the dental profession to-day is the old story of the conflict of progress and conservatism, and the revival of the struggle between innovation and conventionalism in a new field. Each party or school has its beliefs, its creeds, its doctrines, and its dogmas, which to it are conclusive and incontrovertible. Each sect cannot but wonder at the blindness of the other side, which will not see the truth and have the wisdom to acknowledge and abandon its errors. This struggle has been going on since the dawn of human intelligence in all departments of human philosophy, and in religion and politics progress and conservatism have fought on many a bloody field. And still there is conflict in the newer fields of thought and culture. Reformers rise to preach new gospels and propagate advanced ideas, and conservatives rise to oppose them and act with equal energy and as strong convictions. The merits of an idea have little to do with the zeal of either its support or its opposition; men stand for or against it, while the world reeks with blood, and all because of the inherent obstinacy and combativeness of human nature. Men even become martyrs for opinion's sake and merely from choice, for the history of human conflict in all ages goes to demonstrate that martyrdom proves nothing. Men have fought and died and sought the martyr's crown in the endeavor to uphold and propagate the most absurd and pernicious doctrines, as the history of Mormonism and Mahometanism, for instance, bear abundant witness. Such men labor under a false conviction, of course, and are urged forward by the fire of fanaticism; but such is the case with the extremists and fanatics in every cause, regardless of its merits. Perhaps it is a mental aberration which causes men to go to unreasonable lengths —who knows? If that were probable, then are all men more or less insane, at least on some subject,—of which there is strong probability. An evenly-balanced mind would not commit such indiscretions. In

fact, if man were a reasonable animal, he would find that there was very little real difference, after all, between him and his neighbor, upon any subject. Human necessities are very much alike among all men, and the real causes of evils and their real remedies are very exact, if we could only discern them. Right in that secret lies the weakness of both contending parties in the dental ranks to-day. If we but knew the real causes of decay and the real remedies, we could, if we were reasonable, apply the remedies without fighting about them like children. The necessities of the case are exact, and if we violate their governing laws we fail and suffer. There cannot be such a violent difference of the principles of treatment of caries as the two parties assert, and it cannot be that one school of teaching is altogether right and the other altogether wrong. If they could look upon the facts of the case without prejudice and with a clear and intelligent judgment, both would come nearer the truth. It cannot be but that in this, as in all other controversies, the middle ground is safest, and that it is the path where true and intelligent eclecticism will be found. As a rule an extremist should be condemned because he is an extremist, whether as a reformer or as a conservative. Extremes are notoriously dangerous, and the discriminating practitioner should, in order to be safely guided, reject extreme teachings, whether demanding radical change or opposition to progress. He should select that which he finds, after careful investigation and observation, to be the best thing to do or to use. He must not seize upon everything new because it is new or startling, nor yet must he refuse to adopt a good invention after it has been proved to be good.

And it is this true eclecticism toward which the teachings and controversies of the two contending schools have been, and are now, we believe, leading us. The disputants have, by the very violence of their language, obliged cautious men to think for themselves. Their extreme tenets and theories, with their manifest tendency toward dangerous conclusions, have caused thinking men to investigate and weigh the evidence before casting in their lot with either party. The very facts of their bitter opposition and the animosity displayed on both sides have caused their claims to be viewed with suspicion and their practices to be avoided. So they have been doing good inadvertently, and not in a way they perhaps intended, except so far as each school can congratulate itself upon having modified the teachings of the opposing school and neutralized its effects in practice. As a result of this suspicion and mistrust of both schools by the moderates in both camps, it transpires that there are very few practitioners who use either gold or the plastics exclusively. Most of the gold men use some of the plastics,

but if they do not use much amalgam they indignantly deny being plastic men. Some plastic men use gold as much as some gold men, and yet advocate plastic fillings. So the contending camps are divided in theory, but by a curious inconsistency are not very far apart in practice. This demonstrates, as we before remarked, that if man were a reasonable animal he would find that after all there was but little real difference between him and his neighbor. Every conscientious operator acknowledges that the practice of either extreme tenet will not do, and in practice he selects intelligently from the entire field as the peculiar requirements of each case may demand. And yet, in the discussions upon this subject this same operator will take a side as if he were an extremist himself, and defend that side with great vigor. He is very inconsistent—an extremist in theory but an eclectic in practice. He does not advocate what he practices, nor practice what he advocates.

This inconsistent operator is a fair example of the mass of the profession to-day. The controversy will in time necessarily work itself out, because the inconsistency now exhibited by the rank and file between their theories and their practices cannot last. They are bound to harmonize, and then the conflict will be at an end, because the conscientious and consistent extremists will have no followers. We will thus in time reach a safe middle ground and an atmosphere of pure eclecticism. What is good in the teachings of both schools will be preserved, and what is bad will be expunged, when they have emerged from the fire of criticism and experimentation through which they are passing. All that is unscientific and impracticable will be excised, and both will come forth purified,—and, indeed, victorious,—in proportion to their deserts. This will be accomplished mainly through the discrimination of the cautious practitioner. His class is composed of the moderates in both camps.

The cautious man is the bulwark of progress and the saviour of his profession. He listens to the claims and teachings of the leaders and fanatics in all schools, sects, and parties, patiently according them all the opportunity to be heard which they may desire, and, after hearing all they may have to say, he cautiously weighs and digests their theories and teachings, and adopts that which will serve him and rejects the rest. He is the repositor of that saving quality of eclecticism which winnows the wheat from the chaff and carefully preserves and develops that which is good by critical experimentation. A good idea thenceforth becomes a part of the intellectual capital of the profession.

But while the cautious man should resist all vagaries and extreme theories, he must, on the other hand, avoid developing a skepticism towards the opinions and teachings of others which will shut him out

from the benefits to be derived from them. He must be candid with himself as well as critical of others, and remain permeable to good ideas and influences. He will then fulfill his mission of saving the profession from going to impracticable extremes and preserve to it all that is good from whatever source it may come.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION—TWENTY-THIRD ANNUAL SESSION.

Second Day.—*Evening Session.*

(Continued from page 533.)

The Committee on Prize Essay reported a resolution awarding the prize of $200 for the best essay on the "Etiology of Dental Caries" to Dr. W. D. Miller, of Berlin. The resolution was adopted, but at a subsequent session that action was reconsidered, and the report was referred back to the committee.

Section V. was taken up, and the association proceeded to the the special order, the discussion of Dr. Bödecker's paper, "On the Action of Arsenious Acid upon Dentinal and Pulp Tissue." *

Dr. Bödecker illustrated on the blackboard the effect of arsenious acid when placed in contact with the dentine. The case described was that of a tooth with superficial decay in the enamel. A hole was drilled a short distance into the dentine, and into the hole a small portion of arsenious acid was placed, and the cavity carefully sealed. Within three days, although the drug was not placed near the pulp, its action had extended through the intervening dentine until the pulp was nearly destroyed. From his observations in this and other similar experiments, Dr. Bödecker was led to believe that where arsenious acid comes into contact with normal dentine it exerts an irritating effect on the dentinal fibers, causing them to swell and enlarge, and at the same time the basis-substance is narrowed in proportion to the widening of the canaliculi.

Dr. C. N. Peirce, Philadelphia. How long was the dentine exposed to the arsenious acid in these experiments to produce devitalization of the pulp?

Dr. Bödecker. From three to six days. He expected to be able to show the same effect, possibly in a modified degree, after one day's exposure.

Dr. Peirce. Have these specimens been compared with pulps devitalized by other means than the application of arsenic?

Dr. Bödecker had many specimens showing this action, but they

* See Dental Cosmos, October, 1883, page 505.

were stained with chromic acid, and he had abandoned that reagent. He had therefore not been able to bring the whole matter before the association, but he had thought it was better to give the information in a fragmentary form than not at all.

Dr. Peirce. It seems to be unsafe to ascribe the action in these cases to the arsenious acid when there has been no comparison with pulps devitalized by other means. When we assert that the arsenious acid is the cause of the result shown, we need to know what changes would have taken place without the presence of the arsenic.

Dr. Bödecker. Among the specimens is a piece of the devitalized pulp taken from near the apex of the tooth after three days' exposure. The arsenic to produce its effect had to travel all the distance from near the outer periphery of the dentine to this point. He did not think a local influence could have produced the effect. He had seen hundreds of cases of devitalization caused by pulpitis, but there was nothing in them like the result produced here. Where pulpitis is the cause of the devitalization some parts of the pulp will usually be found in a healthy condition; here the whole pulp is dead.

Dr. G. J. Friedrichs, New Orleans. Which preparation of arsenic did Dr. Bödecker use?

Dr. Bödecker replied that he had relied altogether in these experiments on a preparation of Wallstein's. He could positively say he had used arsenious acid. In this direction he would employ only perfectly pure materials.

Dr. W. P. Horton, Cleveland. What tooth was it from which this specimen was taken, and what were the age and sex of the patient?

Dr. Bödecker. The patient was a girl, eleven or twelve years of age; the tooth was a lower molar.

Dr. T. L. Buckingham, Philadelphia, would ask Dr. Bödecker if he knew of any process by which the action of arsenious acid could be arrested at any given point, a portion of the pulp cut off, and the rest kept alive.

Dr. Bödecker replied that he had stated in the paper the results of his experiments in that direction. Of sixteen amputations there was one good result, eleven of the stumps died, and as to the remainder he had no knowledge.

Dr. Friedrichs wished merely to call attention to the fact that the name arsenious acid, commonly applied to As_2O_3, was a misnomer. You cannot have an acid without hydrogen.

Dr. S. C. G. Watkins, Montclair, N.J. How much of the preparation did Dr. Bödecker use in these experiments?

Dr. Bödecker. Just as little as possible.

Dr. Watkins. How long were the experiments continued?

Dr. Bödecker. From three to six days.

Dr. Watkins. Is it safe, as a rule, to leave the application so long?

Dr. Bödecker. No. In three days' time you have the devitalizing effect of the arsenious acid clear to the apex. The longer it is left the greater will be the destructive action.

Dr. W. W. Allport, Chicago. Does Dr. Bödecker regard the changes observed as being due to the presence of the agent in the pulp or to pathological changes in the tubuli of the dentine?

Dr. Bödecker. That is not yet determined. It will require a great many experiments and a great many animals on which to perform them.

Dr. Frank Abbott, New York, had examined the specimens shown by Dr. Bödecker, and from what he could see he should judge that the conditions presented by the dentine were very much the same as those produced by any other irritation—any other irritating agent. The rapidity of the work was due to the intensity of the irritation, by which the contents of the canaliculi were swollen and broken up. It seemed to be exactly the same condition that had been described by the speaker in 1880 as characteristic of deep-seated caries. The conditions looked the same, though of course he could not say that they were the same. The dentine upon which the arsenious acid had acted appeared to be in an inflammatory condition, which was the conversion of the tissue into embryonal elements.

Dr. J. Taft, Cincinnati. How is the enlargement of the tubuli accomplished? Is it by the removal of the interstitial material, or by its being pressed aside? If there is removal of any part of the contents there must be solution.

Dr. Bödecker had definitely stated that he saw a resemblance between the conditions seen and those presented by caries, the difference being that in this case the action was very much hastened. He did not want to say, without further proof, that caries is the same as the action produced by arsenious acid; but he would investigate the matter as far as he could. He had also stated that while the canaliculi swell, the intermediate substance is absorbed, so to speak; where the lime-salts go he could not say.

Dr. Taft. This is a very interesting subject, especially for those who have been in the habit of using this agent on the pulp or for obtunding sensitive dentine. He had not used it for, perhaps, fifteen years. There are several things to be thought of in connection with the use of arsenious acid, especially the difference of susceptibility to its effects which has been observed in various patients.

In some it will act more rapidly than in others, even when the teeth seem alike dense. It has been observed in some cases that it will act definitely through a thin lamina of dentine; in other cases it will destroy the life of the pulp in even a very short time. Another thing to be considered is the age of the patient; the older the patient, as a rule, the greater the resistance to the action of arsenious acid. Years ago he had applied it to the teeth of young persons in very small cavities, for obtunding sensibility, and the teeth were destroyed in twenty-four hours. In one case that he recollected he made an application of arsenic in a small cavity to the tooth of a girl of fourteen. This was in the afternoon, and by the next day at noon the gums were congested and the tooth purple. Dr. Taft related other cases of the same nature. Proceeding, he said that these peculiarities were referred to because they ought to be borne in mind all the time by those who use this agent in their operations on the teeth. With regard to its action on the pulp, sometimes the most unexpected results were met with. The effect varied widely. Reduced to a very small quantity the drug still had its effect. Again, cases were encountered where the utmost toleration of the presence of arsenic on the part of the pulp was met with. In one case in his experience, in the tooth of a patient aged thirty-five years, the devitalizing preparation was applied six or seven times in as many days, and the pulp was just as much alive at the end as at the beginning of the treatment, and it continued in good condition for eight or ten years afterward.

Dr. Bödecker. Dr. Taft mentions that the action of arsenious acid varies with the density of the tooth. In this regard the speaker's experiments had not been very widely extended among human teeth. He had found no adults willing to permit him to experiment upon a sound tooth. In children's teeth (the deciduous set) he had experimented a little. He had also experimented on the teeth of one very old rabbit. For the purpose of testing the action of the arsenious acid he had drilled holes in three of its teeth,—and they were tremendously hard,—and he had been surprised to find exactly the same changes as in other cases.

Dr. Taft did not know that the changes would correspond with devitalization, as he had not made experiments to test the matter. He had found the things of which he spoke when he used arsenic in his practice.

Dr. Allport. Had there been any hemorrhage from the pulps which Dr. Taft reports as having died so easily?

Dr. Taft did not know, but he thought not.

Dr. T. L. Buckingham, Philadelphia, had been led to believe, from experiment, that changes in the pulp-tissue produced by arsenic

were caused by its presence rather than by any chemical combination between it and the elements of the tissues. When applied to the dentine, as stated in the experiments related, he thought it acted in this way: A certain portion is dissolved and follows down the tissue until it reaches the pulp, on which it acts by its presence; and thus it may go on and on. It will penetrate some dentine much more rapidly than others. In cases where there is difficulty in procuring the proper action of the agent, if the cavity is stopped up for two or three months, there will usually be no further trouble in devitalizing the pulp.

Dr. E. Parmly Brown, Flushing, L. I., said, if Dr. Bödecker has discovered that we are doing wrong in using arsenic in the treatment of the teeth, he wanted to know it; to know why it is wrong practice. If he used anything with good results he could tell why the good results followed the application. If in one case he should put in too much of the arsenious acid, and it should eat away a portion of the alveolar process, is that any reason for abandoning what has proved a mercy to his patients in many other cases? He was very anxious to learn, but he had never yet read anything that led him to believe that arsenic was anything else but a mercy.

Dr. Edgar Park, St. Louis, had been very careful in the use of arsenic, and had had cases where he could not devitalize the pulps. On investigation the cause was found to be calcification—pulp-nodules—in the root. If the application was made below this point there would be no difficulty.

Dr. E. V. Richardson, England. Arsenious acid is used in England with great freedom, and at the same time with proper caution, for obtunding sensitive dentine, and for devitalizing pulps it is used almost universally; though he had known some men who discarded it entirely and used other remedies. He would call attention to a new method of treatment, by taking away the circulation by means of hot air. In many cases it gave almost immediate relief. He heartily indorsed Dr. Brown's sentiments as to arsenious acid being a mercy to patients.

Dr. Taft. If there is anything at all in Dr. Bödecker's experiments, if there is anything at all in the changes which he has seen after the application of arsenic to the dentine of a tooth, if he is not wholly mistaken, we ought to be very careful in the use of this agent. Either he is mistaken, or the use of arsenious acid in the treatment of sensitive dentine or for the devitalization of pulps is wrong.

Dr. Brown. Is there any proof that the change which Dr. Bödecker has noted is not a benefit? Is there any evidence that the part of the tooth upon which its influence was exerted would not last the better for what had been done to it?

Dr. Horton. In all experiments of this kind, in order to have a proper guide, we should know the temperament, the age, and the sex of the patient. These very important points are often left out of the calculation. An observer would be more likely to make a mistake with a high power of the microscope than with a low power. To guard against any possible error the experiment should be repeated many times. The speaker was very cautious in the use of arsenic in sensitive dentine, because early in his practice he had had a patient with four front teeth devitalized from arsenic applied to reduce sensitiveness; and he almost never used it for devitalization, because he practiced the method of saving the pulps advocated by Dr. Atkinson. He had made failures at first in attempting this method, but now not one in a hundred goes away with a devitalized pulp. It is only in very rare cases that he resorts to the use of arsenic.

Dr. W. H. Atkinson, New York, thought the speakers should be held to the subject. The range that the discussion had taken, it seemed to him, was unkind to Dr. Bödecker, who had stated clearly that what he reported was only the beginning of a series of experiments which he hoped would reveal the law of the action of arsenious acid under such circumstances, which would be of value to the profession. We might ask many questions which would have no bearing on the point. He thought what had been reported was a clear statement of what had been revealed by the microscope, and he was not willing that we should scatter all over the ground when we have so clear an issue—as to how arsenic acts upon the living tissues of the tooth.

Dr. Bödecker said that he did not use high powers all the time, but used whatever power was necessary for the purpose in hand. The question to be determined in this case was, if we put arsenic in contact with healthy dentine, and in three days it works its way down and devitalizes the pulp, what will be the result if we put the agent directly upon the exposed pulp?

The subject was passed.

The election of officers and the selection of the next place of meeting were made the special order for Thursday evening.

Dr. N. W. Kingsley, New York, then addressed the Association on the "Mechanism of Speech." He had devoted many years to efforts to improve the articulate speech of those who have had the misfortune to be afflicted with cleft palate, and had performed many experiments and given much study to the subject. Articulate speech is the result of the action of the organs of speech upon the voice. The sounds produced by cleft-palate patients may be as perfect as in other persons, but they fail in the manipulation of the organs to

produce what we call articulate speech. A vowel sound is a single note produced by the uninterrupted passage of the tone-column through the buccal cavity, and changes in the form of the oral cavity produce the various vowels used in articulate speech. The division of one continued sound into vowels is purely arbitrary. All cleft-palate patients produce the vowels as perfectly as anyone. There is no defect in their speech here. It is only when they attempt the interruption to that sound, which is the sole element of speech in which cleft-palate patients are deficient, that their defect is seen. The stoppage of the vowel sounds produces the consonants. Some of these are made by interrupting the current of sound in the back part of the mouth by contact of the soft palate with the pharyngeal wall and the tongue or with both. For these sounds there must be absolute closure between the soft palate and the posterior wall of the pharynx. In cleft-palate patients such a closure is impossible, and therefore their speech is defective. Probably all of you have heard the speech of cleft-palate patients. The speaker could not yet comprehend why there should be so much difference between them in their ability to articulate properly. It was certainly not from a lack of knowledge of the effect of certain conditions. He believed he understood that; but some would articulate sounds which he would say that they could not possibly produce, while others with almost perfect organs could not possibly do so. He would repeat the statement that unless there is absolute closure of the space between the soft palate and the posterior wall of the pharynx, distinct speech, as we have it, is impossible. He did not know why surgeons when called upon, in such cases, continued to perform staphyloraphy. If staphyloraphy is performed the palate will be too short at the rear, and hence there will always be defective articulation. He had resorted to mechanism to supply the defect; but with all that he had accomplished in remedying the difficulties in the way of perfect speech for this class, he was obliged to say that he had never yet seen a cleft-palate patient in whom there was not a slight peculiarity of voice, even after the best service that was in his power had been bestowed. He had seen scores where the articulation was as perfect or more so than that of any man in this room, but there was a peculiarity of voice which could be observed (which he illustrated by speaking for a moment with the nostrils closed), a taint of something in the voice which was likely never to be overcome. If it was overcome it was usually by accident. He would not despair of vanquishing even this difficulty, though experiment for perhaps a lifetime might not give him victory.

As to the character of the apparatus to be used, he had devoted many years to experimentation in soft, elastic apparatus to overcome

defects in the soft palate; but after the patient has learned to articulate properly with this it can be substituted by a hard apparatus. He was at present using a hard vulcanite bulb. [The shape of the apparatus was illustrated on the blackboard.] It consists of a hollow bulb so constructed that the contraction of the pharyngeal wall will shut off the volume of sound, as is essential to the production of certain consonants. Each apparatus will differ in some slight particulars from every other one, and must be constructed for the case in hand. To get the proper size and shape will require study and experiment. The taint in the voice before spoken of was caused by the resonance of the posterior nasal cavity or of the whole nasal cavity. To overcome it would involve changes in the shape and relative position of the apparatus, and the wearing of it by the patient for months. He had heard speakers in this assemblage whose articulation was worse than that of many cleft-palate patients.

In reply to a question by Dr. J. D. Patterson, Dr. Kingsley said that the action of the pharyngeal muscles was discovered by introducing a gold bulb upon which is softened rubber; the effort to speak will produce an impression upon the rubber, and thus by continued experiment we finally arrive at the result desired. With an elastic apparatus there is no difficulty in teaching the patient to articulate, but the form required must be determined by experiment.

Dr. G. R. Thomas, Detroit. Does not the speech improve with the continued use of the apparatus?

Dr. Kingsley. If you purchase a Steinway piano, you have no guarantee that it will make music. The instrument may be as perfect as it is possible to make it, but you must learn to play upon it. So with the apparatus for the cleft-palate patient. It may be just what is required to enable the patient to articulate properly, but as to how long it will require for the patient to learn to use the apparatus, he did not know. It depends largely on the aptitude of the student. Some learn much more quickly than others.

Dr. Thomas would like to know further whether there is any way by which we may be satisfied when the apparatus is done that it will be right.

Dr. Kingsley. There will be no improvement in the speech at first. By experience we learn to know when the apparatus for a given case is what is required to enable the patient to acquire correct articulation.

Dr. W. H. Atkinson. Have you ever noticed that patients after learning to speak with the apparatus are able to dispense with it in talking without any appreciable difference in their articulation?

Dr. Kingsley. Yes, and I don't know how to account for it.

Dr. W. C. Barrett. Dr. Kingsley has made apparatuses for dif-

ferent nationalities. Has he ever observed any greater difficulty in patients of one nationality learning to speak than in others?

Dr. Kingsley. It is easier for the French to speak French than for the English to speak English; with the Germans the difficulty is about the same. I have no experience beyond those nationalities.

Adjourned.

(To be continued,)

SOUTHERN DENTAL ASSOCIATION—FIFTEENTH ANNUAL SESSION.

SECOND DAY.—*Afternoon Session, continued.*

(Continued from page 539.)

THE Committee on Pathology and Therapeutics reported two papers by Dr. A. G. Friedrichs and Dr. G. J. Friedrichs, respectively.

Dr. A. G. Friedrichs, New Orleans, read his paper, which was entitled "Nitrogen Monoxide."

Dr. Friedrichs would not advise the use of anesthetics on every trivial occasion. Anesthesia is not indispensable in the extraction of teeth where there are no complications. Where operative difficulties would render the extraction long and painful: as where roots are solidly implanted in the alveolus, or where they are affected with subacute peridontitis and the surrounding parts are much inflamed, or where forcible opening of the jaws is necessary, or where a number of roots are to be extracted, the use of an anesthetic is necessary. The question then arises, What anesthetic shall we use? When the operation does not require a long time for its performance, he would answer, unhesitatingly, nitrogen monoxide. A late work by Dr. Darin furnishes the following statistics:

Cases of death by Chloroform . . .	53	in.	152,260
" " " Ether	4	"	92,845
" " " Nitrogen Monoxide,	3	"	300,000

The deaths from nitrogen monoxide, could not be indisputably ascribed to the anesthesia produced by that agent, as in one of the three cases, the cork used to keep the mouth of the patient open got into the trachea. Can anything be more convincing than the above figures? Yet in the face of these statistics you will still find practictioners to tell you that the use of nitrogen monoxide is dangerous. Nitrogen monoxide does asphyxiate, which may frighten some, but certainly without reason, because its administration is under perfect control. We can moderate or even stop its administration in time to prevent harm. Nitrogen monoxide occasions none of the dangerous phenomena of the brain and heart to which the use of chloroform is liable.

Anesthesia is produced in two ways: First, by a toxic effect upon the nerve-centers, which is the method of action of chloroform, ether, etc. Second, by asphyxiation, that is, by diminishing the quantity of oxygen in the blood. Nitrogen monoxide produces its effect in the latter way. In experiments in its administration by Bert, Coyne, and others, it was shown that when the blood of the animals experimented on contained only from 2 to 3 per cent. of oxygen, the animals could be punched or punctured without manifesting pain—the true anesthetic period of asphyxia. If the experiment was prolonged the insensibility to pain continued, and was followed by dilatation of the pupil of the eye, a sign upon which Bert lays particular stress, the proportion of oxygen in the blood being reduced to from 1 to 2 per cent. Pushing the experiment still further the animal died, at which time the proportion of oxygen was reduced to 1 to .05 per cent. It will thus be seen to what extreme anesthesia with nitrogen monoxide may be pushed before death would occur. Being unfit for respiration, this agent asphyxiates; but it does not poison, and as soon as the administration is stopped, the patient begins to regain consciousness, recovering sensibility so rapidly that operations must be performed hastily. At the end of a few minutes the effect passes off entirely, and the patient is able to go about his business without headache, nausea, or other disagreeable consequence.

Chloroform does not asphyxiate, which fact necessitates care in its administration that it be mixed with the due quantity of air, and what is worse, we are unable to foresee how patients will tolerate it. It does not produce cyanosis, but pallor, irregular and stertorous breathing, and feebleness of the pulse. All these symptoms are a source of uneasiness. It sometimes kills, and in these cases it kills not by asphyxia, but without warning, and we are helpless to afford the least aid to the unfortunate victim. Again, when the inhalation is stopped, consciousness returns slowly, and when it is regained, it is accompanied by nausea, headache, and a long list of other disagreeable sequelæ. All the objections urged against chloroform hold as against ether, though in a moderated degree. So that we must consider ether as more dangerous than nitrogen monoxide.

With reference to the objection that not every patient can be anesthetized with the gas, Dr. Friedrichs said that the refractory patients were rare. He had used it thousands of times and had yet to see the patient that could not be subdued. He would admit that nitrogen monoxide was not so convenient of application as either chloroform or ether, but he thought that when human life was at stake a trivial inconvenience would hardly warrant the use of a more dangerous agent. Besides it could be had in the liquefied form, in cylinders of

100 to 500 gallons, reducing the difficulty of transportation and application to the minimum. He hoped he would see the day when nitrogen monoxide would be the anesthetic agent for all the operations of minor surgery. As soon as it is better known its security will make it the universal anesthetic for all operations that require but little time for their performance. There are two conditions wherein nitrogen monoxide would be contraindicated: First, in grave lung trouble, and, second, where there is an organic lesion of the heart. If unable to examine the heart, he would advise, at least, that it be seen that the pulse is regular; and if not satisfied, that the patient be sent to his family physician for his opinion. With these precautions this agent can be used without danger and with a perfect assurance that no ill effects will follow its administration.

Dr. Geo. J. Friedrichs, New Orleans, read his paper, which was entitled "Arsenic."

Dr. Friedrichs's paper opened with a history of arsenic, in which was condensed a large amount of information concerning the uses to which the various compounds of the mineral have been put, their effects on man and the other animals, and on the vegetable kingdom, etc. Continuing, he said, the two preparations generally made use of therapeutically are arsenic trioxide, As_2O_3, (improperly denominated arsenious acid) and liquor potasii arsenitis, better known as Fowler's solution. Arsenic has been largely used as an antiseptic, but recent researches show that its action in this regard is limited.

Passing to the use of arsenic in dentistry, the paper alluded briefly to the exhibition of the drug in neuralgia. It should be given in very small doses, and exclusively after meals. You all can testify as to the efficacy of arsenic trioxide in devitalizing the dental pulp, though little is known in regard to its pathological effects on the tooth-pulp. The only experiments in this direction so far reported are those of Dr. Arkövy, of the University of Buda-Pesth, Hungary. The points he proposed to determine were, 1st, the correct quantity of As_2O_3 to be used; 2d, what the minute changes are which the pulp undergoes; 3d, whether any mischief is done to the dentine, enamel, and cement; 4th, In what light must we look upon consecutive periodontitis. The results of Dr. Arkövy's experiments upon dogs were:

I. As_2O_3 brought into contact with the tooth-pulp produces a certain amount of inflammatory hyperemia, total or partial, depending upon the quantity of the agent applied; the blood-vessels become expanded to three or four times their regular diameter, and have a tendency to thrombosis. This latter effect may also be in connection with embolism of the capillaries when the agent is quickly taken up into the blood-vessels.

II. It produces no coagulation of tissue whatever.

III. It has a specific influence upon the blood-corpuscles, combining with the hemaglobin to form a compound of arsen-hemaglobin, evidence of which is found in the diffuse yellowish tinge of the whole pulp-tissue and in the discoloration of blood in several of the vessels.

IV. In nearly every case it is taken up in substantia (in form of molecules) into the blood-ways. When there it produces, besides the above-mentioned changes, granular detritus of their contents and anemic collapse, shrinkage,—the latter effect nearly exclusively in cases where greater doses are used.

V. The bulk of the pulp-tissue—connective-fibers and odontoblasts—undergoes no change whatever: the connective-tissue cells increase to three or four times their normal size.

VI. The special action of As_2O_3 upon the nerve-elements is as follows: the nuclei of the neurilemma are somewhat increased; in the axial part, after the application of more than one mgr., granular detritus of myelin sets in and the axis-cylinder commences to disappear here and there.

VII. All these alterations occur in and among normal-looking tissue.

VIII. As_2O_3 if not brought into direct contact with the pulp, that is, if a thin wall of dentine lies between them, does not produce any of the alterations mentioned, even where 5 mgrs. are used. The inflammation produced can only be looked upon as the product of the irritation of a foreign body placed close to the pulp, and having a different conducting power of heat and cold.

IX. It seems to have no action on the dentine, although, if the dentine is left for a long time under the influence of As_2O_3, a slight tumefaction of some of the dentinal fibrils can be seen, while the hard substances do not alter at all.

The writer has never used As_2O_3 in combination with acetate of morphia (the usual form of exhibition), but in combination with creasote had seldom found it to cause pain. Periodontitis is a sure sequence of the use of this agent, unless carefully guarded against. Where periodontitis ensues there is no doubt that it is caused in the majority of cases by the use of too great a quantity or by allowing the drug to remain too long in the cavity. Dr. Friedrichs differed with Dr. Arkövy's conclusion, that "unless As_2O_3 is brought into direct contact with the pulp it does not produce the effects mentioned," provided the agent is allowed to remain a sufficient length of time. There may be exceptional cases where from idiosyncrasies or other causes it fails to destroy the pulp.

As showing the influence of idiosyncrasies, Dr. Friedrichs related two cases that had come under his observation. In the first the patient was aged about twenty-seven, of sanguine temperament; teeth dense and highly organized. In one of the superior bicuspids the pulp was exposed. The usual application of arsenic was made, but it was only after many renewals of the application that the pulp was devitalized, which was removed piecemeal. In about a month after it was filled, the tooth began to be troublesome. It would ache by fits and starts, seemingly more from a local neuralgia than from pain caused by an acute inflammation, and it finally had to be extracted. About a year later, the mate of the tooth that had been lost became

involved in the same way. The same obstinacy in devitalizing was met with, and, mindful of the previous failure, no attempt was made to fill until it seemed certain that a favorable result might be looked for; but the same physical symptoms ensued as in the case of the other tooth, and this, too, was finally extracted as the only relief to the patient.

The second case was of a young man whose teeth were of soft texture, and nearly all more or less eroded at the necks; the sixth-year molars had been previously extracted. The second lower molars were so badly decayed that they were filled with amalgam, as the best that could be done. In a short time the patient could neither eat nor drink anything hot or cold without great suffering from one of the teeth which had been filled. No improvement being found at the end of three months it was decided to devitalize the pulp. After two applications of the arsenic, with only temporary relief, the patient was treated for malaria, with some benefit. The arsenic was again applied at intervals for about two weeks, when thermal changes ceased to have any effect. The dentine still appeared sensitive, and the tooth was filled with but little further excavating. Within a week past the tooth has been seen—over five years since the operation, during which time it has rendered good service—and it still looks alive, with prospects of lasting many more years.

Dr. Friedrichs had also recently seen a case—a lower molar—in which he had allowed himself to be persuaded to use arsenic to obtund very sensitive dentine ten years ago, and the pulp was still alive; although at the time it was filled—some ten years ago—sensitiveness was perfectly obtunded, leading him to believe that the full effect of the drug had been produced. It takes courage, in the face of the condemnation that has been heaped on this agent, to use it to obtund sensitive dentine, yet he believed if we knew the idiosyncrasies of our patients, or perhaps rather, understood the action of this agent better, a great deal of suffering might be saved by its use.

Adjourned.

Third Day.—*Morning Session.*

The subject of Pathology and Therapeutics was taken up.

Dr. A. O. Rawls, Lexington, Ky., said there were one or two distinct conditions which came within the province of dentistry, in the treatment of which we have as yet failed to attain success. They are not at all understood, even by the best and most advanced operators, and it is yet common for the patient to endure the most destructive lesions, which baffle the best efforts for their relief. The speaker was aware that he touched upon dangerous ground when he said, that, in his belief, one of these diseases was incurable. He

alluded to pyorrhea alveolaris. We haven't even a suitable name for it; hence, it is known by many different names. This lesion—that is, one form of it—has never, so far as he has seen, been successfully combated. There is a wide difference of opinion as to what it is. He has known men to talk of it as a local disease. That, he contended, was another condition from the one to which he referred, which was constitutional. This made it impossible to cure the disease by topical treatment: it made it impossible for the new granulations to retain their integrity long enough to be formed into strong, resistive tissue. You may remove the local causes, yet the condition will remain, permitting the destruction of tissue until finally the loss of the tooth ensues. He considered that it was a subject of so much importance, that if we could not get at the means of cure so as to protect patients who suffer from the disease, by means of discussions in our societies, a special committee should be appointed to investigate it. He would have the profession find out what it is, if possible, and remedial agents would follow. He had seen cases which Dr. Riggs pronounced cured, and which in one year after the cessation of treatment were in as bad condition as ever. He could take cases to those who professed to cure this disease by local treatment, which he would defy them to cure without systemic medication. The ravages of pyorrhea alveolaris could be much alleviated if more dentists understood the means of local treatment; but it is useless to attempt to cure by local means when the disease has passed what may be called the local stage; when the process is all broken down, and you can push an excavator through it as through old cheese. He had seen this disease where the tissue was disintegrated between the stellate cells or Haversian canals as far down as the maxillary nerve, the line of disintegration being no larger than the thickness of a pin. Yet it was there, and it may extend in this way from one tooth to another, and, so long as it remains, a permanent cure cannot be effected; but the parts left to themselves after local treatment will continue to disintegrate. The cause of the softening of the bone is that it does not have proper protection and proper nutrition, and there can be no cure until you have cut away every particle of bone until you reach the point where there is proper nutritive action. We must have this round of nutritive current, this sharp clashing of the atoms, and the harmonious music of the molecules before typical health can be looked for.

It is a mistake to ascribe this disease to any special systemic disease, like scrofula, or scurvy. They will cause it indirectly, but the former is more apt to affect the glandular system. In scurvy the disease attacks all parts of the system, but the first effects are seen in the periosteum of the bones; but this disease is localized in the mouth.

Its victims may be men and women of perfect physical organization otherwise, with the firmest muscular tissue. The speaker had seen it in families the members of which were noted for longevity and for their physical strength. He knew a family, in three generations of which he had seen pyorrhea alveolaris, and they are as strong as they can be in every other respect. Their teeth begin going at about the age of twelve years, and keep on through regular stages until all are gone, and they are not lost by decay. As a rule, the teeth of this family are very free from decay.

He had tried in some instances to remove all possible local causes for the disease, yet it had gone on in spite of his efforts. One difficulty was found in the fact that, no matter how carefully they were treated, the gums would not unite with the necks of the teeth after they had once been separated, and thus gave entrance to the secretions which would act as an irritant—more powerful than the lime-salts—especially if the débris of pultaceous food found lodgment between the gums and the teeth. To obviate this he had applied, in some cases, a piece of rubber dam, in such way as to guard against the entrance of any foreign matters into these spaces, and he had found that the good results of treatment endured longer in such cases than in those where no such precaution was taken. In local treatment, to obtain any degree of success, we must first have the necks of the teeth perfectly closed around by the gum.

Dr. R. Finley Hunt. Does Dr. Rawls think that pyorrhea alveolaris results from a local or from a systemic cause?

Dr. Rawls. It is the local expression of a systemic disease. He had never yet retreated from the position he took several years since that the particular phase of the disease he had described was incurable. He believed it was caused by the use of mercury. In nine cases out of every ten that had come under his observation he could trace it to that cause, either in the individual, or further back, among his immediate ancestors. Those who use salt to excess for a long time will have the same expression, and the excessive use of tomatoes,—especially canned tomatoes,—long continued, will produce the same result.

Dr. L. D. Carpenter. Is it possible for absorption of mercury from an amalgam filling to occur?

Dr. Rawls. In order for mercury to be absorbed it must be presented in a soluble form. The protochloride is not soluble in the fluids of the mouth; the oxide is soluble. Under certain circumstances we might have absorption from fillings. He had seen cases of sore throat which were certainly caused by amalgam fillings.

Dr. B. H. Catching, Atlanta, said, Dr. Riggs is now writing a treatise on this disease, which will be published before long. He thought

it should be called Riggs's disease, because Dr. Riggs had devised the best method of treatment for it that has yet been brought out. There was therefore as much reason in naming it for him as there was in calling Bright's disease after the physician who had studied its pathology and given the world the first real knowledge it had received upon the subject.

Dr. Rawls objected to naming a disease for any man. Dr. Riggs had not touched upon the disease to which he had reference. He has taken merely the local causes for the condition, and his services in that direction were most valuable, but this disease has its origin deeper down, in a constitutional condition. It should be known by a name which would give a good idea as to its nature.

Dr. G. F. S. Wright, Columbia, S. C., would ask if any gentleman present had ever used lactic acid in the form of sour milk in the constitutional treatment of this condition?

Dr. W. H. Morgan, Nashville, Tenn. It has been said that a machine is just as strong as its weakest parts. This statement is applicable to the human organism. There are two ways in which the machine may be broken,—by corrosion, as by excessive wear of the parts, or by strain. Just so in this disease. General causes may weaken the whole system, or the weakened condition of the part may cause a predisposition to this disease: so that it may be provoked by a local or a systemic condition. Systemic treatment in cases where the disease is dependent on systemic conditions is valuable. Dr. Riggs's treatment goes down on the weakened tissues and destroys some of them and disturbs the rest. The result is an irritation and the binding up and repair of the parts. But this treatment does not go far enough in some cases. Take, for instance, a tooth one-fourth of which is denuded, from around which the secretion is poured out on pressure being made upon the gums; the pericementum devitalized and a portion of the bone dead. This must be scraped away, for the dead bone, if left, will be an irritant. Protoplasmic matter is thrown out and repair set up, but it never attains to the perfect condition of the original tissue. The new growth is more like scar-tissue. This disease bears some relation to scurvy, and in its treatment salt foods should be eschewed. It should generally be treated on the expectant plan, supplying nutritious foods, but denying salt meats. Local treatment should be continued by friction. Carbolic acid, applied directly in full strength, is best to produce healthy granulations. Salicylic acid is excellent as a mouthwash in these cases.

Dr. Winder would ask Dr. Rawls how he accounted for the fact that, in extreme cases of pyorrhea alveolaris, after the teeth have been lost by its agency the manifestation of the disease ceases.

Dr. Rawls replied that it was simply because when the teeth were gone there was nothing to cause the continued irritation which lay at the bottom of the disease, and the parts all healed up from below. If a single tooth were left the trouble would still go on. He believed that if the supply of nutrition was once cut, it could never be reëstablished in as perfect a condition as before the interference occurred; that there was never a perfect reunion of the parts; especially in such tissues as dentine and cementum.

Dr. Winder. Cannot this condition be produced by the continued application of irritants?

Dr. Rawls. Yes; by calomel, for instance.

Dr. R. Finley Hunt, Washington, D. C., thought that the profession confined themselves too much to treatment for local conditions.

Dr. W. W. Ford, Macon, Ga., would ask if it was not a fact that pyorrhea alveolaris generally developed on the sides of the teeth nearest to the salivary ducts. That being granted, does it not follow that the disease is developed from the character of the secretions? Does not the irritant approach the oral cavity by means of the salivary glands?

Dr. J. R. Walker, New Orleans, asked Dr. Rawls what treatment he had found most effective.

Dr. Rawls did not apprehend that pyorrhea alveolaris was caused by the local condition of the glands. While it was true it was oftenest found in the position indicated by Dr. Ford, it was due to the fact that the physical conditions of the parts permitted its development in that situation better than in any other.

The treatment with which he had achieved the best results was the same treatment that he would use against mercury,—just as he would treat mercurialized patients,—with iodide of potassium; for local treatment, something to keep the parts clean: but we should use no strong irritants. A slightly antiseptic wash may be used, though he did not think this did any special good. All that is necessary in that direction is done by the operative treatment. What is wanted is to prevent the introduction of irritants. If the patient suffers from anemia or scrofula, use tonics or such other constitutional remedies as are indicated. If the patient be robust, of full habit, there is no necessity for these.

Dr. Walker stated that he had been a close observer of this disease for thirty years, and he was convinced that one prominent cause of it was the mode of living. Those persons in whose food grease, in the shape of butter or hog products which have been subjected to a high degree of heat, figure extensively, are more prone to this disease than others who abstain from this class of foods. In a number of cases persons of the former class who had been persuaded to

abandon the objectionable articles of food had experienced decided relief. In treating the active stages of the disease, he had derived the most satisfactory results, after the removal of the dead-line, from the use of the following remedy: one part carbolic acid, one part tincture of iodine, ten parts glycerin, six parts chloride of soda. These were mixed together, and to the mixture was added sufficient of the chloride of zinc to coagulate the mass. It is applied with a quill as far up as the deepest points of suppuration. After using it a few times, you will find that the quill will not pass so far up between the tooth and and the gum, and gradually the line will descend until it will not penetrate at all.

Dr. Winder. When it is admitted that this disease can be produced by the continued application of a mechanical irritant, it seemed to him that the local origin of at least some cases of pyorrhea alveolaris was acknowledged. While it is undoubtedly true that the general condition of the patient has a wonderful effect on the progress and cure of the disease, he could not consent to its being classed exclusively as a systemic disease. He had seen cases which he could state positively were cured by local treatment. One case, a young girl, of about eleven years of age, he specially recalled. Nearly every tooth was loose. It was first seen in 1876, and Dr. Riggs operated at the first clinic he had ever seen him give. Local treatment undoubtedly helped the case.

Dr. E. S. Chisholm, Tuscaloosa, Ala., thought we were liable to confusion on account of the many names by which this disease is known. Dr. Rawls says it is sometimes a local disease. If it is a local disease let us so classify it; if systemic, let it be so classed. We may have many causes all conspiring to one end and it is of the first importance that all the disturbing causes be sought out and removed as far as practicable.

Dr. Morgan related the case of a gentleman, of florid complexion and good health, who lost his teeth from this disease at the age of forty-five. The eldest daughter sought his services, at the age of twenty-five; at this time about half her teeth were gone. With the other children he made it his business, once in six months, to examine their teeth carefully, looking particularly for evidences of this disease. Whenever any tendency to pyorrhea alveolaris was shown he treated the teeth for from a week to a month, and the result was that until they were married and passed out of his hands none of the other children had an aggravated case. The friction which has been suggested, properly applied, is one of the most potent prophylactic measures. It should be a firm gentle pressure, with the finger or napkin, applied to all parts of the gum. The sort of friction required is that kind which hardens the hands and gives integrity to the muscles.

Dr. Winder wished to indorse the view which Dr. Morgan had advocated, with reference to the efficacy of friction. It also agreed with Dr. Riggs's idea.

The subject was passed.

Drs. G. W. H. Whitaker, G. F. S. Wright, and D. Hopps were appointed a committee to report resolutions upon the death of Dr. H. J. Royall, of Savannah, Ga. The report of the committee, which was made at the afternoon session, was adopted by rising vote.

Adjourned.

Afternoon Session.

On motion of Dr. McKellops, the constitution was ordered to be published in pamphlet form.

The association then proceeded to elect officers to serve for the ensuing year, and to select the place for the next meeting. The result was published in the Dental Cosmos for September.

Dr. H. J. McKellops announced to the association the death of Dr. Marshall H. Webb.

Dr. W. H. Morgan was appointed a committee of one to prepare an eulogy of the character and services of Dr. Webb, to be published as a part of the Transactions of the association.

Dr. H. J. McKellops, the newly-elected president, was installed, and made a brief speech, thanking the members for the honor conferred upon him and promising by every means in his power to endeavor to forward the usefulness of the association, to which end he asked their cordial coöperation.

The committee on dental appliances made a partial report through Dr. W. W. Ford, chairman, and on motion were allowed time to complete their labors, the report to be sent to the publication committee for publication in the Transactions.

Adjourned to meet in Lexington, Ky., Tuesday, May, 6, 1884.

NEW YORK ODONTOLOGICAL SOCIETY.

(Continued from page 551.)

Dr. Kingsley. The subject assigned to me by the executive committee was that of "judicious and injudicious extraction." That is a very large field, to go over which in a thorough manner would take us many evenings. I am not able to exhaust it, and I shall not try to do so. There is not a man here who should not be able to contribute something to the common fund of knowledge on such a subject. Dr. Clowes has so contributed. I had intended beginning this discussion by reviewing the order of the shedding of the temporary teeth and the eruption of the permanent set. My mind was very clear upon that order, as I have almost universally seen it in a

practice of more than thirty years. And my mind was not only clear from my own observation, but it corresponded with the order as recorded by, I believe, all other observers, excepting Dr. Clowes. I was astounded when Dr. Clowes gave, first the lower central incisors, then the lateral incisors, then the canines, then the bicuspids, etc. Well, he has lived longer than I have and been longer in practice, and it must be that he speaks from average results; perhaps when I have practiced as long as he has I shall have seen enough cases of an order of eruption so entirely different from what I have seen heretofore to make the average the same as his; but it will have to be uniformly different hereafter from what it has been heretofore to bring such a result. Gentlemen, let me give you the order of eruption, as I have observed it. First, the centrals; second, the laterals; third, more likely the second bicuspid in place of the second temporary molar; fourth, the first bicuspid; fifth, and last, the canines. The canines in both the upper and the lower jaws are the last of the temporary teeth to leave the jaw. There are occasionally exceptions in which that order is not followed out, but they are very rare, and to expect anything else until we see the evidence of something else is to expect something that is not at all likely to happen. To base our practice upon any other order of eruption, and upon an order of eruption that is an exceptional order, is, I think, to make an egregious mistake. If the order I have indicated is followed out, I think we should see judicious extraction, while if an order is followed that we only see in exceptional cases, I think we should find most injudicious extraction. I have seen so much irregularity of the teeth caused by following advice of the kind that Dr. Clowes has given, that I wish to raise my voice in warning to every young practitioner to guard against it; and I should say, as emphatically and dogmatically as a man can pronounce, that he would be just as certain, if he followed the advice of Dr. Clowes, to produce *irregularity*, as that the order of eruption that I have indicated is universal. I have no means of giving the number of cases that I have seen where the canines of the permanent set were forced entirely out of line, standing outside of the jaw completely, and the lateral incisors and bicuspids standing close in contact; for no other reason, apparently, than that the temporary canines had been removed to make room for the lateral incisors.

Let me here read a passage from my "Oral Deformities" (page 7): "Whatever may be the inducement to remove any or all of the deciduous teeth prior to their period of shedding, the canines should be retained until there is ample evidence of the early emergence of their permanent successors, unless the health or comfort of the child would be sacrificed in so doing." This sentence, which I wrote

more than a dozen yeas ago, and which was the result of long years of close observation, is printed in italics, so that no such thing would ever follow thereafter in the practice of any one who paid any attention to the sentence, and a dozen years of experience since then only confirm that opinion; and if I were to print that sentence again I would put it in double caps, if thereby I could make it stronger.

Passing from this, let us refer to the general subject of the extraction of the temporary teeth and the influence that it may have upon their permanent successors. The idea has been somewhat generally entertained until within the last few years, and, perhaps, is now, that the removal of the temporary teeth will cause shrinkage of the jaw, and that consequently the second teeth will be crowded and irregularly placed. This is a mistaken notion; for there is evidence enough that the premature removal of any of the temporary teeth, with the exception of the canines, is not likely to cause any serious disturbance to the jaw or the dental arch either in its regularity, the order of eruption, or in any other way; so that, while it is desirable to keep the temporary teeth in position until the eruption of their successors is determined, there are many cases that come into our hands where the comfort or the health of the child demands their extraction. The fear that the jaw will shrink, as a result of the extraction of the temporary teeth, is unfounded; jaws will develop, even if there is not a temporary tooth in the mouth, or a permanent one either, for that matter. The growth of the teeth is a function which goes on entirely independent of the development of the jaw, and the jaw is bound to develop to its full size whether the teeth make their appearance upon the surface or not. Whatever apparent contraction may be observed is confined entirely to the alveolar process. It is the tendency to close up the vacant space that may exist between any permanent teeth that are erupting, that makes even the appearance of shrinkage of the dental arch; so that, when the canines have been extracted prior to the time for the eruption of their permanent successors, and the permanent teeth each side of that space are nearly fully developed, you will find an inevitable tendency of the permanent teeth to crowd over the vacant space and approximate each other, and in a great many cases they come in actual contact.

The removal of a canine to make room for an erupting lateral seems to be necessary because the space between the points of the temporary canines is not nearly so great as the space that ultimately exists between the points of the permanent canines, and so it is not unreasonable for one who has not reflected upon the subject to say: "Here are two great big central incisors in the upper jaw coming

through to take the places of two little diminutive temporary centrals. There is not room for them; we must *make* room by taking out the laterals." The extraction of the temporary laterals leads, by the same reasoning, to the removal of canines when the permanent laterals present themselves. But, if you had not removed four teeth to make room for two, you would have found that nature would have done the work which you are anticipating. It is very rare that nature does not come to the assistance of nature. It is the fulfillment of a law of nature that is pushing through those central incisors; nature is looking out to find a place for them, and she will, in the majority of cases, certainly and inevitably do it. There is very little to fear from the premature loss of the temporary central incisors.

A child of mine told me one day, when she was between three and four years of age, that one of her upper teeth was loose. I examined it, and, to my astonishment, found it had all the evidence of having no root at all. Not long after that it became so troublesome that I took it out. I looked anxiously for the results in that case. It was three or four years before the permanent successor of that tooth made its appearance. In the meantime, I saw the space enlarge—widen and widen—until there was ample room for the permanent central incisor. The other temporary central remained the usual allotted time, while in the case of the one that I removed there was complete absorption of the root so long anterior to the time for the appearance of its permanent successor. We might digress here to a profitable discussion upon the correlation of eruption and absorption. Is it the pushing forward of the permanent tooth that compels the absorption of the root of its temporary predecessor? Or is it the absorption of the temporary tooth that permits its permanent successor to advance in that direction? Arguments have been made on both sides of the question; and if I were disposed to engage in an argument for the sake of argument, I should be perfectly willing to take either side, for I could cite so many instances that would seem to prove that absorption of the temporary tooth was caused by the permanent tooth pushing forward and trying to find a place, that the ordinary juror would give me the verdict; and, on the other side, I could bring so many apparent proofs that the roots of the temporary teeth are absorbed without any reference to the presence of their permanent successors, that from another juror I would gain my case.

I think it would be impossible for any individual to give a final determination to the question of what is the rule for the removal of the temporary teeth. He could only give a principle, and the practitioner must be governed by judgment and experience in the application of that principle. There may be a thousand and one things

and circumstances to vary different cases and determine the action that is proper in them. You can formulate a principle only, you cannot establish a rigid rule.

Dr. Jarvie. Do you think the extraction of the second temporary molar before the eruption of the first sixth-year molar has any influence upon the position of the sixth-year molar?

Dr. Kingsley. I do not think it would. Before the period would arrive for the sixth-year molar and its roots to be so fully developed that it would have a tendency to move forward, the crown of the second bicuspid, which takes the place of the second temporary molar, would already, in all probability, be so fully formed, if not erupted, that it would hold the sixth-year molar in its place. I believe that the study of any anatomical specimens which showed the teeth of that age, would lead us to believe that such would be the reasonable result.

I have been requested to say a few words on one or two points, but which have been partly included in what I have already said. To make the illustration more definite, picture to your minds a person of adult age, with all the permanent teeth sound and occupying their proper places in the dental arch, *with the exception of one or both canines.* In this picture, we see a temporary canine, firm and solid in the jaw, with no apparent or marked fullness on the gum above it, either outside or inside, certainly no pointing of the permanent tooth through the gum, or any indication of its immediate eruption; the temporary canine is firm and without decay. The question is: shall we extract this temporary canine or not? Recently I saw a report of a case in which the gentleman says that he removes temporary teeth when the time arrives for them to be removed, without any reference to the appearance of their permanent successors. He expects that the permanent tooth will make its appearance on time; he believes that the presence of the temporary tooth is retarding the development of its successor, and as the time has arrived for that successor to be erupted, he extracts the temporary tooth, and he says he has found it good practice in a great many cases. I know that I have seen it equally bad practice in a great many cases. A grandmother, sitting in my chair to-day, when I spoke of a left superior canine in her mouth as being a very fresh-looking tooth, said, "it did not make its appearance until two years ago." I asked her, "was the temporary tooth in place all that time?" "No." "When was it taken out?" "During the war." "By whom?" "By the elder Dr. Flagg. I know it was during the war, because at the time he took it out we were talking about the battle of Vicksburg." For eighteen years that lady was with a vacant space there, wondering why the permanent canine did not put in an appearance. Was

it judicious extraction to remove that temporary canine at that time? We do not know all the circumstances which led Dr. Flagg to extract it, but, with the evidence now before us, we should say it was injudicious.

A few days ago, Dr. Hill, of Brooklyn, sent to me a lady of that age which none guess: I have seen women of forty who did not look older, and I have seen women of twenty-five who looked as old. She had a temporary canine in the upper jaw, right side, and there was the point of the permanent canine close to the central incisor on the inside, between the lateral and the central, but closer to the central. It was pointing in a way to indicate that it was lying diagonally in the jaw, and the temporary canine filled the entire space between the lateral and the bicuspid, being an unusually large temporary canine and peculiarly handsome in color, and I doubt whether a cursory observer would have discovered that it was a temporary tooth. It showed no movement on taking hold of it with the fingers. Dr. Hill sent a note asking my advice as to the removal of this temporary tooth. My answer was: Certainly not, at present; a few months hence we may change our minds. That will illustrate the opinion I would hold and the advice I would give under such circumstances as that.

Perhaps the next important question that we find disturbing us is, what tooth, or teeth, shall we remove to correct irregularities? It seems to be the prevailing opinion among dentists that the canines should be saved at all hazards; and I think the opinion is sound and wise. Of course, there being exceptions to all rules, there may be rare cases where it would be otherwise. In a case where the canines stand entirely outside of the jaw, shall we attempt to expand the arch and bring these teeth into line, the laterals and bicuspids being almost in contact, or shall we sacrifice one of the teeth already in line, by taking out either the lateral incisor, the first bicuspid, the second bicuspid, or the sixth-year molar? There are four teeth to choose from; the question is coming up constantly: what shall we do? As nearly as a single statement can answer the question, I should say, if the articulation and the occlusion of the lower teeth with the upper was good, the bicuspids and molars of the lower jaw falling into the cusps of the upper jaw as we would expect to find them, and the general masticating apparatus was in good condition, I should hesitate very, very much about removing the sixth-year molar to make room in the dental arch to force the canine into line. If the sixth-year molar was in bad condition, so that it would soon have to be removed anyhow, I might decide differently; but in that case it would not be removed because we wanted to force the canine into line, but because it was

a bad tooth and had to go anyhow, and we only took advantage of circumstances. But, if the teeth were all sound, and the articulation and occlusion with the teeth of the other jaw good, I should narrow the question down to the lateral incisor and the first bicuspid. In deciding between the lateral incisor and the first bicuspid, I should be governed partly by the position of the canine. If the canine was standing right over the lateral, so that it would seem that the apex of the root was right over the lateral incisor, I should then say that it would be foolish to extract the first bicuspid in order to force the canine into place, for it would be almost a deformity when you got it there, if you did succeed in getting it there. In such a case I would not hesitate to extract the lateral incisor. A canine does not look much like a lateral incisor, I will admit,—it looks more like a bicuspid,—but I have seen many a mouth, even in young ladies of excellent personal appearance, who had had the misfortune to have lost, for some reason, the lateral incisors, and in which the canines were occupying their places. By cutting off the sharp point of the canines the arch is not disfigured by their presence, even in the case of a young lady, who has no hope of some covering to the upper lip. In the judgment to be used in extracting teeth for the purpose of correcting irregularity, a great many circumstances must be taken into consideration, all of which cannot be included in such a brief address as I am now attempting, nor, indeed, in any work written on the subject. It is an almost daily occurrence for me to receive plaster models accompanied by a request for my advice as to which teeth should be extracted; and those models will sometimes come to me in such shape that recently I was disposed to say that if the natural teeth in the mouth looked like the teeth in the models I would extract every single one of them; and if the articulation was as faulty as the articulation of these plaster models, I would pull them all out, or else I would not do anything. When models are sent for advice they should be good models, and even then they are of little use. It is only by seeing the faces of the individuals themselves that you ought to form a judgment. You have no right to form a judgment without seeing the patient and studying the face, for there are many circumstances necessary to the formation of a correct opinion, which cannot otherwise be considered. Therefore, I repeat again, that the advice that can be given in this form must necessarily be of a very general nature.

Dr. Dodge. In the case last spoken of, where the canines were almost or exactly in front of the laterals, why do you extract the laterals rather than the canines?

Dr. Kingsley. It is a pertinent question, and the answer is, that the canines will be likely to remain in the jaw longer, and will be

more serviceable, more desirable and better teeth than the laterals. That is the only reason.

Some little time ago a poor boy was sent to me by his mother. In his mouth the lateral and the bicuspid were in contact, and the canines stood above the laterals, fully developed, but not fully elongated, growing out in such a way on each side as to make the lip protrude. I told the boy to go where gas was given and have those canines extracted. I think it was almost the first time in my life that I have directed such a thing to be done; but I knew that the boy was to be sent into the country where he would have the care of no dentist, nor anyone to take any interest in the matter, and so I thought the shortest and surest way out of the difficulty would be through the extraction of the canines, all the rest of his teeth being well articulated and in good position. I sent the boy, with my card, to one of the houses where they administer laughing-gas. He came back and reported that the dentist would not extract them, saying, "even if Dr. Kingsley says, extract them, I will not do it." Half pettishly, I said, "if he knows more than I do about it, tell him to take out any one he chooses." He took out the first bicuspid on each side. That was three or four months ago. A few days ago I saw that boy, and the canines have dropped into line as beautifully as you ever saw.

Dr. Lord. The paper of Dr. Clowes and the subject of judicious and injudicious extraction presented by Dr. Kingsley might properly be considered together; and, but for the lateness of the hour, would doubtless call forth much discussion, and elicit a great difference of opinion, to our interest and profit; therefore, on account of the lateness of the hour, I would suggest that the discussion of this subject be postponed to a future meeting.

Dr. Jarvie. How different are the views that Dr. Kingsley has presented this evening from those we were accustomed to hear a few years since. Fifteen years ago, any gentleman who should have stood in the New York Odontological Society and expressed such sentiments would have been convicted of heresy at once, and boycotted as soon as convicted. But I think Dr. Kingsley's ideas are correct, and in accordance with common-sense. The idea that we must preserve all the teeth in the arch simply because they were placed there, is all nonsense. Dr. Kingsley instanced a case in which the cuspid was outside of the arch, the lateral incisor and the first bicuspid almost in contact, they and the second bicuspid and the first molar being all equally good, and the occlusion perfect, and he said that in such a case he would extract the first bicuspid. I would put it stronger: if the first molar was decayed, but was in a state to be put in good condition by treatment, no matter how

badly decayed it might be, I should still extract the first bicuspid.

Dr. Kingsley. I accept that.

Dr. Jarvie. I think the cases would be exceedingly rare where I would extract a lateral incisor or a canine; I would extract the first bicuspid under almost all circumstances, only excepting some cases where the canine was unusually out of the arch, and the arch perfect without it, or where, for some special reason, there was no opportunity to use regulating appliances, as in the case of a poor person or one who would not be likely ever to see a dentist again. But I do not think of any case where I would want to extract a lateral for a lady. I think I should prefer to extract the first bicuspid and so preserve intact the six front teeth. There is much in this subject of the judicious and injudicious extraction of the teeth that has not been touched upon at all to-night. Dr. Kingsley has spoken upon extraction in cases of irregularity only. The subject might be extended to extraction in cases of decay and for the preservation of the rest of the teeth in the mouth.

Dr. Dwinelle. If I understood him correctly, Dr. Kingsley stated that the extraction of the temporary teeth never resulted in a contraction of the arch; is that correct?

Dr. Kingsley. Not quite. I said contraction of the jaw did not result; that the jaw-bone will go on developing independently of the presence of the teeth. The jaw-bone will develop independently of anything that may occur in the alveolar process and the teeth which the process contains, with the exception of the canines. The incisors may be removed for cause before the time for the eruption of the permanent teeth, and the temporary molars may be removed for cause before that time, without any great apprehension or fear that the arch will become crowded as the result of the removal of those teeth alone; it is when the canines are removed that you get a crowded state of the arch in almost all cases. I recollect none to the contrary. The removal of the temporary molars has never narrowed the space between the sixth-year molar and the canine so that the bicuspids could not come in. If the bicuspids have ever come out of place, I have no reason to believe that it was the result of any premature extraction of their temporary predecessors. I have seen bicuspids come out of the line of the arch, and in almost all cases I could trace it to the continued presence, rather than to the removal of the temporary molars. I have seen it in many cases, and I have questioned why it was that the bicuspid should be out of line, why it should not have taken its usual place, had the temporary molar been absorbed as usual. There is a nice point, which would open up a great deal of discussion. When I say I have seen the bicuspid out of line as a result of the temporary molar remain-

ing there, I do not know that it was the result of it; I only know that it was out of line and the temporary molar was there. I do not know what was the real cause. But I do not believe that, except in some extreme cases, the removal or premature extraction of the temporary molars, one or both, will necessitate the narrowing or shrinking of the space between the canine and the first permanent molar so that the bicuspids will not find their place.

Dr. Dwinelle. I suppose that the reason why the bicuspids are out of line is that the temporary teeth remain longer than they should normally. It often happens that the roots of the temporary tooth become dead, and we know that nature is exceedingly reluctant to absorb the roots of a dead tooth. They are not absorbed; they are thrown off generally by exfoliation. Another question: Whether Dr. Kingsley undertakes to say that the removal of the permanent teeth does not result in contraction of the arch?

Dr. Kingsley. In many instances it does, unquestionably.

Dr. Dwinelle. I have seen it in a case in the upper jaw where, in an effort to regulate the teeth, the two bicuspids and the sixth-year molars on either side had been in succession removed, the arch contracting and the remaining teeth advancing continually until the twelfth-year molars impinged firmly upon the cuspids, so that the twelfth-year molars, in the contracted circle, relatively occupied the place of the three teeth formerly in front of them. None of the lower teeth having been removed, one of the worst kind of cases of *protrusion of the lower jaw* was the consequence. The upper jaw had contracted down to less than the breadth of two fingers.

Dr. Rich. That is the result of the absorption of the alveolar process.

Dr. Kingsley. Certainly. We should probably find, if those cases were followed up, that in the end we should have complete absorption of the alveolar process, and the jaw would ultimately be just the same; if the teeth had remained in and been all removed at one time, the resultant jaw would be substantially the same in both cases. I cannot conceive that the lower jaw would have any different shape.

Dr. Rich. I do not see how the absorption of the alveolar process should change the immense mass of the jaw. It would be astonishing if it could,—the mass of the jaw is so great in comparison with the alveolar process,—and certainly it is impossible for the shape of the jaw to be changed by the extraction of a tooth or two. The loss of the alveolar process will produce all those appearances, and, in fact, sometimes produces the most marked deformity. I have seen the whole side of the face sunk in from that cause; the alveolus was all gone, but the jaw was intact.

A Member. I would like to ask Dr. Kingsley what, in his opinion, caused the protrusion of this jaw?

Dr. Kingsley. I have no opinion in the matter. I could guess, but my guesses would be worthless.

Adjourned.

The New York Odontological Society held a regular meeting on Tuesday, May 15, 1883, at the house of Dr. Wm. Jarvie, Jr., 105 Clinton St., Brooklyn. The meeting was called to order at 8 o'clock P.M.

The president, Dr. S. G. Perry, in the chair.

Incidents of Practice.

Dr. Wm. Jarvie, Jr. The case of mania of which I spoke at the last meeting has since proved a very interesting one to me. At that time I knew of it only what I had been told; but the history, as I then gave it, was quite correct. I went to see the patient a day or two after the meeting of four weeks ago to-night, and I assure you that I have since had anything but a pleasant experience. He commenced by telling me what ailed him, saying that he had a watch that was filled with electricity, that he had some machinery in the back of his head, had machinery in different parts of his body,—in fact was filled with machinery, and it made him feel very strangely. This is the direction his imagination takes, although that is the only time he referred to any such peculiar condition. He is exceedingly suspicious of strangers, and does not want to have anything to do with them. He was very much averse to my seeing his teeth, saying there was nothing the matter with them, and he did not see why I should have come to inquire about them. I finally examined his mouth, and found the tooth spoken of at the last meeting to be a left superior bicuspid with a large gold filling in it. I removed the filling and found an unsuccessful case of pulp-capping; that is, the pulp had died, although the tooth had given no pain from the time it was capped. The pulp was dead two-thirds of the way in the roots, and a small quantity of pus exuded from the pulp-chamber. On the other side of the mouth was a first superior molar with an immense amalgam filling, which had been put in fifteen or sixteen years previously, and put in, apparently, very well. To remove it required different instruments from any I had with me, so I did not disturb it then, but another day I went and removed that filling. It was a long and tedious operation, and under peculiarly uncomfortable circumstances, for we knew not at what moment the patient might jump up and forcibly object to further treatment. Of course,

arrangements were all complete for such an emergency, but the fact that it might arise at any moment was anything but reassuring. I found the pulp entirely dead in the roots of this tooth, and the odor was quite offensive, but there was no pus. The next time I went the patient objected to have me see his teeth at all, and no persuasion or urging on the part of his family availed anything; I had to leave without seeing them at all that time. The next time I went it required a threat of force before he would permit me to see his teeth,—we had quite a time over it; and I treated his teeth from time to time under such circumstances. It was the most uncomfortable three weeks that I ever spent in my life. From the time I left him until I went to see him again I was thinking of the case. I am not at all sure that the young man's teeth have anything whatever to do with his malady. He has slept very much better since those fillings have been removed, and he has been very much more quiet, but that the removal of the fillings had anything to do with it, I do not pretend to say. I filled the teeth temporarily with gutta-percha a week ago.

Dr. W. H. Dwinelle. May I ask if Dr. Jarvie has taken any measures to cure the ulceration about that bicuspid?

Dr. Jarvie. There was no abscess there. There was pus exuding from the pulp, the pulp being alive at the end of the root. In the molar the pulp was devitalized to the extreme end of the roots, but there was no abscess. I visited the patient seven times, and have treated one of the teeth six times, the other one five times. The roots of the teeth seemed to be in good condition, so I filled them temporarily with gutta-percha.

Dr. Howe. What treatment did Dr. Jarvie give the one in which the pulp was partly dead and partly alive?

Dr. Jarvie. Just wiped the root out with a broach and cotton, and then applied creasote.

Dr. Miller. There was no fistulous opening about either one?

Dr. Jarvie. No, sir.

Dr. Dwinelle. I have a singular case, regarding which I would like some advice. Last October I completed an operation upon a lady's teeth, in all respects, as I conceived; I particularly cleaned her teeth and polished them. The two front teeth were slightly eroded, and I polished and burnished them down, as I generally do. After I get down to the true surface I think it is well to thoroughly polish and burnish teeth, for which purpose I use a bloodstone burnisher. I think it is very desirable that the enamel-surface should be polished as thoroughly as possible. We know that the rough surface of marble will retain a great quantity of fluid, comparatively, and that if you polish it down it will retain little or none.

The theory is that polished surfaces are less apt to retain foreign substances, in all forms, because there are no nuclei to hold them. Take a piece of broken marble and throw water upon it and it will retain a considerable quantity of the water; polish the marble and then throw on water, and it slides off, or runs to common centers, leaving clear spaces between. This lady's teeth were in as perfect order last October as any I ever saw, yet she came to me in the early part of February with the two centrals, especially (and the two laterals somewhat less so), grooved all over with deep grooves, which would remind you of the hieroglyphics on the obelisk in our park, the grooves running mostly across the teeth, and interlocking with one another, encircling spots of enamel at intervals, the grooves being very deep and covering nearly the whole surface of the tooth. To find the cause for this was a diffcult problem to solve. Of course I was inclined to think that acids had more or less to do with it. I questioned the lady in regard to her diet and manner of living, and how these teeth had been exposed, but all to no effect, at first. Finally I obtained the information that she was in the habit of eating lemons,—sucking them constantly,—three or four a day.

Dr. Brockway. Was it a recently-formed habit?

Dr. Dwinelle. It was a habit formed since last October. Some physician had told her that if she would eat lemons her health would be greatly improved. I disposed of the lemons at once, and put her upon an alkaline diet, together with phosphate of lime and various forms of phosphatic foods. I also had her make a paste of phosphate of lime and cover her teeth with it, over that laying wet paper, on going to bed at night. She came back on the 26th of February, and, from the appearance of the teeth at that time, I made up my mind that this process of disintegration of the enamel had been nearly or quite arrested. The impressions, of which I have a variety taken at different times, will show the appearance of the teeth. Having made up my mind that the process had been arrested, I thought the sooner I resorted to the treatment of polishing them down the better. I have polished one of them down. Of course, there has been a great waste of the enamel, but I was afraid that unless I did it now the process might go on, and I felt that a shallow pit was less likely to perpetuate itself than a deep one; so in one of them I polished out the grooves entirely; but I did it with fear and trembling. The lady is coming back in a week or ten days, when I shall probably polish off the other one. The labial and lingual surfaces of the laterals are somewhat affected, also, but not so much. I arose for the purpose of obtaining information and advice; if you can give me any, I shall be very much obliged to you. The erosion covered the entire surface of the teeth, and, what was

singular about it, these grooves being very deep, were interlocked and intertwined, and almost the entire surface was covered. It was singular to see the grooves interlock each other, like disk-work almost, and yet there would be, at intervals, little spots of the true surface, the polished, normal surface of the enamel; it was cut down into canyons, so to speak, and very sharply cut, as though it was done with an instrument. This was entirely from the use of lemons, and was produced since last October.

Dr. Rich. Did this go on after she abandoned the use of lemons?

Dr. Dwinelle. I think I have arrested it. This was in the early part of February when she came to me, and the second time she came was on February 26. Within a week I have polished one of them down, leaving the other for next week.

Dr. Rich. In a case like this I should like to know the object of the treatment, if she had abandoned the lemon, and the lemon was the original cause of the trouble.

Dr. Dwinelle. The treatment is tentative. I am doing the best I can. To fill the teeth is wholly impracticable, because you would have to fill over the whole surface.

Dr. W. A. Bronson. Without hope of instructing Dr. Dwinelle, I will bring to your notice an instance tending to show how little any single case will prove. I have a lady in my care whose right central incisor is now becoming grooved almost precisely like those mentioned by Dr. Dwinelle. She disclaims the use of acids, saying she has never been able to use them, even in the simplest forms, without systemic derangement. In her case the destruction has not advanced so rapidly as in Dr. Dwinelle's case. It has been in progress for about six months. During the last month or two it has not advanced much. Ten or twelve years ago I had another case which showed the peculiar disintegration of enamel produced by acids. I could not, after searching inquiry, discover the cause; nor were two or three professional friends any more successful. I covered her teeth with oxychloride of zinc to protect their surfaces, and afterwards found out that she was in the habit of eating grapes, literally by the hour. She had a quantity nearly always by her, and would suck them continuously. Discontinuing this habit effected a cure of the enamel-disintegration. Her teeth still show the effects of the grape-eating, but they are now in comparatively good condition.

Dr. Dwinelle. Several years ago, Dr. Westcott, of Syracuse, made some experiments with reference to the effects of different kinds of foods, condiments, and fluids upon the teeth. He found nothing so injurious to the enamel as the common raisins, or their infusion.

(To be continued.)

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At the annual meeting of the Pennsylvania Association of Dental Surgeons, held on the evening of October 9, 1883, the following were elected officers to serve for the ensuing year: E. H. Neall, president; John Hellings, vice-president; Theodore F. Chupein, recording secretary, corresponding secretary, and reporter; W. H. Trueman, treasurer and librarian.

Theodore F. Chupein, *Secretary.*

EDITORIAL.

STATE DENTAL LAWS.

The following is an exhibit of the dental laws in the several States, so far as we are advised, their character and requirements as to examining boards, graduation, license, and registration. We publish it in answer to many inquiries in reference thereto:

STATE.	AUTHORITY RECOGNIZED.	REQUIREMENT.	REGISTRATION.
Alabama..........	Examining Board.	Graduation or License.	Probate Court.
Georgia..........	" "	" " "	Books of Board.
Illinois..........	" "	" " "	County Clerk.
Indiana..........	" "	" " "	Not Required.
Iowa..............	" "	" " "	County Clerk.
Kentucky........	" "	" " "	Books of Board.
Louisiana........	" "	" " "	" " "
Michigan.........	" "	" " "	" " "
Missouri..........	No Examining Board.	Graduation Required.	County Clerk.
Mississippi......	Examining Board.	Graduation or License.	Books of Board and County Deed Records.
New Hampshire	Board of Censors.	" " "	County Clerk.
New Jersey......	Examining Board.	" " "	" "
New York........	Certificate State Society, Dental or Medical College.	" " "	" "
North Carolina.	Examining Board.	" " "	Books of Board.
Ohio...............	" "	" " "	Not Required.
Pennsylvania...	" "	" " "	County Recorder.
South Carolina.	" "	" " "	Books of Board.
Vermont.........	" "	" " "	Secretary of State.
West Virginia...	" "	" " "	Not Required.

BIBLIOGRAPHICAL.

Elements of Histology. By E. Klein, M.D., F.R.S. (Student's Series of Manuals). One volume, 12mo., 360 pages, with 181 illustrations. Philadelphia: H. C. Lea's Son & Co., 1883. Price, cloth, $1.50.

We have read this volume with interest and instruction. It contains forty-three chapters, each one treating of a different organ or tissue, and while of necessity the consideration of the various subjects is brief, it gives much valuable information for the medical and dental student. The illustrations, one hundred and sixty-eight in number, add much to its value. In the first chapter, on "Cells," protoplasm is defined as "a transparent, homogeneous, or granular-looking substance. On very careful examination with good and high powers, and especially when examined with certain reagents, in many instances it shows a more or less definite structure, composed of fibrils more or less regular, and in some instances grouped into a honeycombed or fibrillar reticulum, in the meshes of which is a homogeneous interstitial substance. The closer the meshes of the reticulum the less there is of this interstitial substance, and the more regularly granular does it appear. * * * Water makes protoplasm swell up, and ultimately become disintegrated; so do dilute acids and alkalies." These views are in substantial accord with the teachings of Heitzmann, and at variance with the opinions of previous observers.

In the following chapter, on "Blood-Corpuscles" and their development, it is taught that white corpuscles change into red ones, and that all through embryonal life new white corpuscles are transformed into red ones. The white corpuscles appear to be derived essentially from the lymphatic organs, whence they are carried by the lymph into the circulating blood.

Passing over intervening chapters, our attention is naturally drawn to the twenty-first, entitled "Teeth." Herein we have a clear and comprehensive description of the anatomy of the tooth, and the histology of the enamel, dentine, and cementum of the adult tooth, illustrated with diagrams of the three hard tissues. In the same chapter, treating of the development of the teeth, we have what purports to be a description of this, the most intricate histological and physiological process in the animal economy. We confess to a feeling of disappointment that more space and fuller consideration were not given to this interesting subject, thus avoiding the liability of misleading the student, as is done by the attempt to condense the phenomena of development into so limited a space.

In paragraph No. 233 the term "primitive dental groove" is employed, a term used by Mr. Goodsir in his minute description of the origin of tooth-germs to represent the open groove upon the surface of the mucous membrane around the jaw, and in which he located the dentine-germs of the future teeth, these dentine-germs being the earliest effort towards dental development. Subsequent microscopic investigations have proved the theory of Mr. Goodsir to be incorrect, and we think Dr. Klein was not warranted in applying this term, in describing the process of dental development, to the differentiated subjacent structures which surround the inflection of the columnar epithelium. This inflection of columnar epithelium, serving as the matrix for the future enamel, is the first recognizable attempt toward dental development.

Again, in paragraph No. 237, the author says: "This epithelial outgrowth represents the germ for the enamel-organ of the permanent tooth, *but it remains stationary in its growth till the time arrives for the milk-tooth to be supplanted by a permanent tooth.* Then that rudiment undergoes exactly the same changes of growth as the enamel-organ of the milk-tooth did in the first period of fetal life." This latter statement is correct, but the italicized portion of the paragraph is certainly misleading, as the germs of the permanent successors are constantly growing, and their crowns are fully developed months before the deciduous teeth are dislodged. We are thankful, however, to the author for the amount of attention given to this topic—so much more than works designed chiefly for medical students usually give.

The chapter on "The Mouth, Pharynx, and Tongue," and their glands is worthy of careful perusal.

"Saliva obtained from the mouth," the author says, "contains numbers of epithelial scales detached from the surface of the mucous membrane, groups of bacteria, micrococci, and lymph-corpuscles. Some of these are in a state of disintegration, while others are swollen up by the water of the saliva. In these there are contained numbers of granules in rapid oscillation, called Brownian molecular movement." C. N. P.

The Principles and Practice of Surgery. Being a Treatise on Surgical Diseases and Injuries. By D. Hayes Agnew, M.D., LL.D. Profusely illustrated. Volume III. Philadelphia: J. B. Lippincott & Co., 1883. Octavo, pp. 784. Price, cloth, $7.50; sheep, $8.50.

This is the third and completing volume of the author's System of Surgery, the work, as a whole, comprehending an eminently intelligent discussion of all recognized surgical diseases and injuries. The

three volumes contain twenty-one hundred and ninety-eight illustrations—of which the one before us has five hundred and thirteen. A distinguishing feature of the work is its unpretending, plain common-sense and thoroughly practical character. The author writes from an unusual experience—a lifetime of observation and practice. His teachings, as well as his practice, are characterized by a humane conservatism, and show a higher regard for the welfare of the patient than for a reputation for brilliant and heroic operations. A safe practitioner, he is notably a prudent counsellor. Throughout the treatise there is a conspicuous attention to details, which leaves little to be desired in the way of lucid explanation.

The author is to be congratulated on the completion of a task which, as stated in his preface, has occupied every moment of leisure at his command for more than five years. It will certainly be many more than five years before Agnew's "Surgery" will cease to be the standard authority in the broad field which it covers.

The Roller Bandage. By William Barton Hopkins, M.D. With seventy-three illustrations. Philadelphia: J. B. Lippincott & Co., 1883. Price, $1.25.

This is an instructive little manual, designed to teach, rather by illustration than by elaborate description, the method of applying the roller bandage. The rules for application and the uses to which the dressings are ordinarily put are given in each case. Definitions and general rules for bandaging occupy the first part of the manual.

What to do First in Accidents and Emergencies. A Manual explaining the Treatment of Surgical and other Injuries in the Absence of the Physician. By Charles W. Dulles, M.D. Second Edition, revised and enlarged, with new illustrations. Philadelphia: P. Blakiston, Son & Co., 1883. Price, cloth, 75 cents.

The first edition of this little volume has been for some time exhausted. In preparing this so much new matter has been added, and so many new illustrations, that the result is practically a new book. The directions for the treatment of emergencies are simple and practical.

The Mouth and the Teeth. With illustrations. By J. W. White, M.D., D.D.S. Philadelphia: P. Blakiston, Son & Co. Price, paper, 30 cents.

This is one of the "American Health Primer" series noticed in these pages at the time of its first publication, now reprinted in cheaper form from the plates of the original edition.

We have received from the publishers, Messrs. Ransom & Randolph, Toledo, Ohio, "Health from a Dental Stand-point," by J. M. Hurtt. Price, 25 cents. The object of this little treatise is to give, for popular use, information about the care of the natural teeth.

We have also received a copy of "Pearson's Dentist's Appointment Book, for the Vest Pocket," by Dr. R. I. Pearson, and published by J. L. Brewster, Jr., Kansas City, Mo. Price, 50 cents.

PERISCOPE.

New Operation for the Cure of Ranula.—I do not propose to go into the literature of ranula, its mode of development, the special strictures involved, or a consideration of the differential diagnosis, but to call attention to a method of dealing with those cases that obstinately resist the ordinary methods of treatment, and which, so far as I am aware, has never been resorted to heretofore.

The methods recommended and practiced by surgeons at this day, consist either of the introduction of a seton, injections into the sac, or partial excisions of it.

Of these, almost all modern surgeons give preference to excisions of a portion of the sac—total excision being impracticable.

I have no experience with the seton or injections, having practiced partial excisions in the cases that have fallen under my care, and always with satisfactory results. Having met with a case of double ranula recently, in which this measure, followed by persistent catheterization failed, it occurred to me that I might, by a plastic operation, secure a permanent patulous orifice.

Geo. McG—n, æt. 15, was brought to me May 6, 1882, by his brother-in-law—himself an intelligent physician—with a swelling under the left lower maxilla, nearly as large as a goose-egg. It fluctuated freely, some portions of it seeming hard, however, and projected also into the mouth under the tongue, though the swelling here was not very great, A diagnosis of ranula was made, and a portion of the cyst wall in the floor of the mouth excised. A quantity of clear, transparent mucoid fluid escaped, spurting out several feet as the cyst was incised.

In the course of two or three weeks this had contracted, and threatened to close, and catheterization was resorted to.

In the meantime, a ranula had appeared under the tongue upon the right side, with translucent, bluish, thin walls, but not projecting beneath the jaw. This also was treated by excision of a portion of the cyst wall.

In July the young man ceased to present himself; the orifice closed, the sacs rapidly filled, and Dr. L. again brought him to me in an alarming state from threatened suffocation. Both ranulæ were swollen and painful. Upon the left side the swelling extended well down toward the clavicle and sternum, and across the trachea in front. Upon the right side the ranula was greatly swollen, meeting with that upon the left side under the chin in a continuous swelling,

from the angle of the jaw upon one side around to the opposite angle. Both inspiration and expiration were obstructed—the young man was flushed and feverish. From the rapidity of the occurrence of the symptoms, and their increasing gravity, it seemed as though tracheotomy might become necessary.

I incised the cysts freely, permitting the free escape of the accumulated fluids, and directed hot fomentations to be persistently applied. This gave speedy relief to all the urgent symptoms.

As contraction took place, I again resorted to catheterization, with the view of preventing reclosure. This was persevered in for two or three months, and was more effectual upon the left side, for the reason that the bougie, a soft, conical rubber, about 15 French, could be passed down for two inches and could be felt below the margin of the jaw. Upon the right side a probe only could be used, and when its use was intermitted for a few days it would close completely. I determined, therefore, to make a permanent opening by a plastic operation on that side. Carefully dissecting off the mucous membrane of the mouth over the cyst, denuding a surface as large as a nickel, I then incised the cyst-wall, turned it over, and tacked its free edge to the border of the mucous membrane of the mouth with fine silk sutures, thus, as it were, binding the opening in the cyst with mucous membrane, and interposing an effectual safeguard against its closure.

Union by first intention took place, the stitches were removed upon the third day, and an orifice was secured that has remained patulous to this time,

This was in November last. The young man became irregular in his attendance, and finally ceased to present himself to have the left side catheterized. On the 1st of April he came to me with considerable accumulation on the left side and the orifice closed. I repeated the operation on that side, with a like fortunate result, and now, two months after the last operation, the openings are equally patulous upon the right side and upon the left, and he has no trouble whatever from re-accumulation of the fluid.—*T. F. Prewitt, before American Medical Association, Section on Surgery and Anatomy.*

Concretion beneath the Tongue.—A young man consulted me last week, giving the following history: About three weeks ago he noticed the motions of his tongue caused some slight discomfort, not amounting to actual pain, and he then first observed a swelling beneath it; these symptoms did not trouble him much, till on the evening of the day on which I saw him, while at a meal, he felt something pricking his mouth, and standing before a looking-glass he saw a "white stone" protruding from beneath his tongue, which (the stone, not the tongue) he pulled out with his fingers, and brought for my inspection. On examining his mouth an aperture was seen beneath the tongue, on the left of the frenum (in the usual situation of a ranula), and on passing a probe it was found to lead into a cavity, which extended backwards and inwards behind the frenum for about three-quarters of an inch, and in which the stone had evidently lain. The calculus is about the size and shape of an ordinary date stone, and much resembles in appearance a phospatic calculus; it is friable, laminated, and has a small nucleus

which is harder and darker than the rest of the stone. I do not know if calcareous deposits or degenerations are common in the region of the tongue; Druitt says (Vade Mecum, p. 478), that "the cyst of a ranula when dermoid may become mortar-like or almost solid;" but I think the noticeable features of this case are, the small amount of inconvenience which the calculus caused, for it must have existed for some length of time, and the easy and natural method by which my patient was able to relieve himself. I should add that the left submaxillary gland was swollen and tender, but otherwise the man was in good health.—*R. Geo. Style, M.R.C.S., in the Lancet.*

Myositis of the Floor of the Mouth Simulating Malignant Disease.—A previously healthy man, twenty-six years of age, complained for a few days of difficulty of deglutition, with a burning pain in the anterior portion of the tongue. Three weeks later a swelling appeared under the chin; the tongue seemed to be increased in size, speech was indistinct, and eating of solid food caused pain. When admitted to hospital, five weeks later, the tumor extended from the symphysis to the hyoid bone, was hard, elastic, and painful on firm pressure. On each side of the swelling was an enlarged lymphatic gland. The rapid growth of the tumor, together with the enlarged lymphatics, pointed to cancer of the sublingual gland, but at the operation it was found to be a diffuse infiltration of the lingual and mylo-hyoid muscles. The mass was entirely removed. Upon examination, it presented the characters of a chronic interstitial myositis, and in no part could any sarcomatous or cancerous structure be discovered. Upon the mucous membrane of the floor of the mouth was seen a small but deep ulcer, extending down to the indurated tissues. This was, perhaps, the cause of the myositis. —*O. Kappeler, in Deutsche Zeitschrift für Chirurgie,—Med. Record.*

State of the Gums in Pregnancy.—M. Delestre has observed that not only in pregnancy, but during the menstrual periods, the gums in the female are congested, swollen, and softened. The gingival troubles commence about the second month of pregnancy. Didsbury describes three degrees of gingivitis of pregnancy. In the third, the gums are so inflamed that they have a reddish-violet color, are swollen, and the interdental portions are clearly shown. The tartar and epithelial *débris* accumulate around the teeth. This inflammation may extend to the alveolo-dental periosteum, for the teeth seemed to lose their lime, become elevated, and may fall out. This gingivitis is situated particularly in the anterior portion of the jaws; it rarely goes back of the canine teeth. Only the convex surface of the jaws is attacked. The treatment should be energetic; the tartar should be removed and the inflammation treated by astringent preparations, chlorate of potash, etc., and in grave cases with tincture of iodine, chromic acid, and hydrate of chloral mixed with some astringent tincture.—*Journal de Méd. de Paris.*

Damages for Accident while under Anesthesia.—"The decision of Judge McAdam in a recent suit brought against a dentist of this city (*New York Med. Record*, November 4), to recover for injuries caused by allowing a piece of tooth, which was being extracted, to

drop down the patient's throat while he was under the influence of laughing-gas, is one full of importance, not only to dentists, but to surgeons as well. It was alleged that the piece of tooth slipped from the forceps, and that for four weeks after the plaintiff was troubled with a cough, until he finally expectorated the piece. The court held that while the patient was under the influence of an anesthetic which deprived him of the use of his faculties the operator was bound to exercise the highest professional skill and diligence to avoid every possible danger, and in this case it was the opinion of the court that the circumstances shown were sufficient to carry the case to the jury on the question of negligence. The judgment appealed from was in favor of the plaintiff for $500 damages, and this judgment was affirmed by the present decision.

"The whole question evidently turns upon the fact whether or no there was negligence. It is fair to presume, in view of the circumstances of the case, the patient being at the time unable to protect himself, that the full onus of any supposed negligence must be borne by the defendant. In view of this it behooves the operator to exercise extraordinary care to prevent accidents. It is hardly necessary to say that this is a rule very generally observed by surgeons, and accidents inflicting injuries on patients are, in consequence, comparatively rare. No reasonable excuse can be offered for neglect to exercise even more than ordinary skill in guarding against such mishaps. The law holds that no person should assume extra responsibility in the management of any case without bringing to the same a corresponding amount of skill to meet emergencies. During anesthesia there is an implied guarantee to the patient that no known precaution that can be taken shall be omitted to guard against every possible accident. The same holds true regarding every step in any operation, the surgeon being bound to exercise his best judgment, his most watchful care, and greatest skill for the benefit of his helpless and trusting patient. That accidents will happen, despite all precautions to the contrary, is well known, and the case under consideration appears to form a striking illustration of the fact. The result of the suit may, however, establish a precedent which is full of danger to any operator who is forced to take extra risks for his patient."—*Medical Times and Gazette*.

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

Will some one inform me how to treat the following case: Patient is a lady, sixty-five years of age, desiring a full denture; the lower jaw is very flat, with the muscles terminating *high upon the ridge*. I have made two sets for her, being careful each time to clear all of the muscles, and yet (to use her own expression) the plate flies up in eating, talking, gaping, etc. I have no trouble with the upper set. Any suggestions to overcome the difficulty will be thankfully received.—F. R. N.

I HAVE read with much interest the article by Dr. J. A. Klump, on "The Effects of Malarial Poisoning on the Dental Pulp," published in the October number of the DENTAL COSMOS. My recent experience in practice tends to corroborate his views to a great extent. In connection with the subject, I would like to ask a question through the department of "Hints and Queries," Has not malarial poisoning a great deal to do with the increased amount of dental hemorrhage that we have to contend with after extraction? I notice that of late years this trying annoyance in my practice is on the increase proportionately to the increase of this malady.—A. H. SMITH, *Rising Sun*, *Md*.

REPLY to the question of A. Morsman, M.D., D.D.S., "Is Pulp-Amputation Correct Practice?" in "Hints and Queries," DENTAL COSMOS for October, 1883.

In the first instance, allow me to say that I *do not* always succeed, but often meet with sad failures; nor do I wish to seem officious in offering an answer to an inquiry propounded by an M.D., D.D.S., being myself simply Griffiths, dentist, though sorry 'tis so. However, truths and facts need no apology, standing as they do by their own unaided strength.

The treatment of exposed pulps may be briefly considered under three heads:

1st. Exposure resulting from preparing the cavity in removing decayed dentine. The pulp, in this case, may be perfectly healthy, or somewhat irritated and inflamed; If the former, and from the general symptoms of the patient I determine that his health is good, I simply cap with a stiff paste of carbolic acid and oxide of zinc, pressed lightly over the exposed pulp, over which I insert bone filling, usually "cement plombe," waiting a few moments for thorough drying, and fill with gold. If the pulp is slightly inflamed, I cap and fill entirely with "cement plombe," avoiding gold or amalgam on account of thermal changes, or possibly failure, and consequently necessity of removal of the filling. In this case I *do not* disturb the pulp by amputation.

2d. Exposure from natural decay and gradual breaking away of tooth-structure, which by neglect has resulted in acute inflammation, attended by spasmodic pains, having a tendency to cause the patient to court death. This condition may have existed days, weeks, or months, at uncertain intervals ceasing and beginning without, to the patient, any apparent cause. In this case I excavate, using carbolic acid liberally, until I can plainly see the pulp, and with sharp excavator cut off cleanly the exposed portion, which operation, of course, is followed by profuse bleeding. If the tooth was aching when the operation commenced, it will, in most cases, have ceased at this time. I allow it to bleed freely, and when it has ceased, which largely depends upon the amount of inflammation, I place a cotton pellet saturated with carbolic acid directly over the pulp, and seal with another pellet of cotton saturated with a thick solution of gutta-percha in chloroform, and fill, if no further trouble ensues, in twenty-four hours. If not perfectly easy after that time, repeat the application of the previous day, and generally on the second day the tooth will admit of capping (thin paste of carbolic acid and oxide of zinc) and temporary cement filling.

3d. Chronic inflammation and advanced stage of ulceration—conditions approaching death of the pulp. Excavate and proceed as in the second case, until the pulp is reached, using carbolic acid in washing out. It may be necessary to enter the pulp cavity to some extent before the pulp is reached, and the operation is usually painful and the odor arising very offensive; when the slough and ulcerated portions are removed, probe the pulp so as to encourage bleeding if possible, though success in this direction may not be attained. Syringe with tepid

water; incline the patient so as to allow the application of carbolic acid upon a probe or excavator into the cavity; insert cotton pellets as in second case; apply iodine upon dried surface of gum adjoining the affected tooth; or in an extreme case lance the gum; encourage bleeding by holding warm water in the mouth, after which apply a preparation of four parts iodine to one of carbolic acid to dried gum. Continue the above treatment until no offensive odor is detected and the tooth is perfectly easy. To fill, mix a *thin* paste of carbolic acid and oxide of zinc; press gently into the pulp-cavity and fill with bone or cement. Pulps, when in this condition and subjected to this treatment, if examined after four or six months, will generally be found dried up and may be readily removed without the slightest pain, and the root prepared and filled. In the two former cases, the pulps will usually be found to have ossified at their exposed portion, and to be apparently in as good a state as prior to exposure.

It will be noticed that carbolic acid enters largely into the treatments above. I have found it an almost indispensable agent in my practice, and when properly used almost infallible in its good results.

The manner of treating exposed pulps, as above indicated, I have found uniformly successful, but have met with failures in each of the three cases—constitutional conditions, diet, climatic influences and other causes, as we know, exert a subtle and potent effect upon the system. Lurking seeds of latent disease may secrete themselves from the most searching eye, only to evince their presence upon the slightest provocation, and the weakened link is the first to part and hardest to re-weld.

Many practitioners evince an almost insane desire to kill and extirpate every particle of pulp, and feel chagrin and actual self-abasement unless they succeed in doing so. For them, given an exposed pulp, and no matter in what condition, they at once determine to slaughter. A patient calls with an exposed pulp, that, perhaps, has never given a particle of trouble, excepting, possibly, a slight sensitiveness; they at once set at work all their wits to kill; employ a powerful agent, and instruct the victim to call in twenty-four or forty-eight hours. The patient, feeling no further trouble or from some cause absenting himself, may, months after, return, having experienced no pain or inconvenience during the interim, and does the dentist simply proceed in a rational manner to prepare the cavity and fill? Not he—that method of procedure would be diametrically opposed to all *his* precedents; he must again place the victim under treatment until not a vestige of life, that he can reach, remains—acting on the old proverb, (reversed), "That one *dead* man is worth a hundred *live* ones."

Theory is one thing, common-sense quite another; there is less of the latter in active circulation and practice than is required to go around.

I am insatiately fond of reading and studying the dental society reports, not only for their large fund of information, embracing scientific research, knowledge gained from experience and with an unselfish desire to impart what they have acquired to the less-informed and younger members, but also for the beatific and collossal ignorance and foolhardiness evinced by some of the aspirants for fame.—GRIFFITHS, *San Francisco, Cal.*

RUBBER *vs.* CELLULOID.—The use of celluloid in comparison with rubber, for mounting artificial teeth has not been fairly tested, except by a very few dentists. It is a well known fact that any third-class dentist can do better with rubber than with any other material. Those who, whatever their pretensions may be, condemn celluloid, and tell their patients that it is far inferior to rubber, are ignorant of the

facts, for when properly manipulated it is in most cases superior to rubber. Having spent nearly fifty years of my life in the practice of dentistry, and being familiar with almost every kind of material which has been used in the construction of artificial dentures, I propose to briefly give my experience.

In the winter of 1872–3 I commenced experimenting with celluloid. I first used the oil apparatus and was not satisfied with the results. In 1874 I procured the steam heater, which I found to be a great improvement. I followed the printed directions, and noticed that in scraping the plates one way the cut was smooth, but in the other way it was rough, as in scraping across the grain in wood, though some of the blanks would scrape smooth both ways. After much reflection and various experiments, I concluded that the heat was not high enough to prevent the molecules overlapping in being forced into a new position. I determined to try the effect of higher heat. When the steam raised the blow-off valve I held the valve down until the steam made a noise like the escape from a steam boiler with a full head of steam. Since then I have had no trouble with plates warping, shrinking, or breaking, though I have made hundreds. I know of but two plates that broke, and the breakage was caused by making them too thin where the greatest thickness was required to give proper strength. My present method in making celluloid is as follows: I take the impression and make the model in the usual way, and select the best plain teeth I can obtain. (For lower cases I prefer weighted rubber on account of its heft.) I adjust the teeth and wax up the same as for rubber, using the same care in flasking—in fact throughout the manipulation until the flask is opened and the wax removed. Up to this point any one who can work rubber can easily work celluloid. I select a blank as near the color of the patient's gum as possible; cut a V-shaped channel deep enough for any supposed excess of material, never coming nearer than one-eighth of an inch to where the wax came out. By doing this I can make the plate as dense as the blank was before molding. I need refer to only one thing about finishing. As the celluloid is not quite so hard as rubber I leave the material a little thicker near the pins than is usually done with rubber. No matter what material is used, repairs will frequently be needed. Rubber plates often break, but celluloid very rarely, if the work is properly done. If a tooth breaks or by any means gets loose, I file out a deep hollow back far enough to form a good bed for the piece, which I fit nicely to the hollow in the plate, always making it twice as thick as the depth of the hollow; I then set the teeth with wax for flasking, and as plaster will extract a portion of the coloring matter, I protect it by varnishing the gum portion with liquid silex, and cover with No. 4 or 5 tin foil. This done, all is ready for flasking. When the flask is opened and the wax removed, I see that the piece to be added is properly fitted, and use a cement made as follows: Add to a saturated solution of camphor, celluloid chips, filings, or scrapings, enough to make it as thick as the white of an egg. I apply a little of this cement to both plate and piece, working the piece a little and pressing it down firmly to bed it well, and holding it there one or two minutes to allow the cement to set. In twenty minutes it is ready to put through the heater. When the heat is up to 300° or 320° Fah., close the flask tight. It makes no difference whether it is cooled off in fifteen minutes or in an hour. When cool enough to be only comfortably warm the case is ready to take out and finish.

As good permanent work may be done with celluloid as with rubber, and in less time. Nearly all of my patients who have tried both give a decided preference to celluloid, when the work is properly done. Either by steam- or dry-heat good work can be done if the heat is raised high enough.—E. Parsons, D.D.S., *Savannah, Ga.*

THE DIFFICULTIES OF CHOOSING TEETH.—Many of the artificial dentures being worn look very unnatural, and especially those made of the gum-block sets. The underlying cause of much of this is that a great many dentists do not know how to choose teeth, because of the difficulty of so doing. I wish to suggest a plan tending to remedy this.

The average dentist at present, instead of being so educated in the beautiful products of the dental ceramic art as to be acquainted with each of the many forms that are manufactured so as to know just what to ask for at the depot, has a vague and misty recollection of different styles, and goes with his sample size and color tooth, but no definite idea of what characteristics to seek in the set to be chosen. A few drawers full of teeth are handed down to him, and out of them he selects a set that "will do;" the size and color are correct (perhaps), and he must hurry back to business.

Now, let us suppose that the patient in the case is a beautiful young lady with an inexpressible dread of false teeth, who by some misfortune has lost all her natural superior dentures; the remaining lower dental organs are pearly and beautiful, long and slender; not placed in that stiff beauty which so many admire, and which characterizes picket fences, but gracefully leaning toward each other's embraces, like that group of statuary loveliness, "The Three Graces." To properly match this lady's teeth the substitutes should likewise be long, slender, and overlapping. Let us further suppose that the arch is narrow, and pointed, throwing well out the center of the lip;—the artificial upper set also should be adapted for a narrow and pointed arch. Again, imagine that the upper gums are prominent and protruding in front; in this case the dentist would require blocks with the gum portion above the teeth shaped to permit of his setting the teeth far enough back. Suppose, besides all these complications, a set made with a short bite is desirable, so that the teeth may be as much covered by the lip as possible. It is not probable that so many complications would occur in one instance, but cases of less complication are of common occurrence, the requirements of which are frequently overlooked by the dentist when he goes to choose teeth. And why? Because it is *difficult* for him under the present circumstances to acquire familiarity with the various styles. With the country dentist it is well-nigh impossible, and the reason for it is that we have little or no literature on the subject. A good-sized book might be written on the artificial teeth of a single manufacturer; and I venture to say that such a book, especially if well illustrated, would find a ready sale, and promote a vast amount of useful knowledge. With some hope of inspiring some one to produce such a book these lines are written. At present, beyond a few pages in Harris I connot remember having met the subject in print.

In view of the importance of the matter it seems that at least the manufacturers of teeth should issue a catalogue, giving a short description of each set, and of the case it was designed to meet. This by being tabulated would be adapted for ready reference. The dentist might by its aid ascertain in a few minutes the set required, and at the depot would only have to make choice of the color.

Such a table could be made on one large sheet of paper (which would be better than a pamphlet, because more readily consulted), and would require about twenty or thirty vertical columns headed with such descriptions as "medium length," "long cusps," "high gums," "short bite," "overlapping laterals," etc. The numbers of the sets would occupy the first column, and marks under the headings would show at a glance the various peculiarities of each set. Any peculiarities which would not come under the headings might be expressed in a few words elsewhere on the chart. The whole would be greatly embellished by a cut of each set opposite its number.

"Order is heaven's first law," but it does not seem to obtain largely at dental depots. If dictionaries were not alphabetically arranged we should grumble at having to hunt through every time we want a word, but we do something analogous thereto in hunting a tooth at a dental depot. But how can we expect it to be otherwise when the dentists themselves do not know what they want? and how should they know unless initiated? Oftentimes from ten to thirty minutes are consumed in finding a set that "will do," and then one leaves in uncertainty as to whether he might not find something a little better if he searched longer, while things might be and ought to be so arranged that he could get the very best set for the case in half a minute.

To dentists ordering by mail it is particularly convenient to order teeth by their numbers, but to be able to do this the dentist must know what numbers to order, and this cannot be known at present without an extensive acquaintance with teeth such as few country dentists have opportunity of obtaining. The city dentist may acquire this education to some extent by noticing the various forms while choosing out of a large assortment, or by studying the sample sets, but to the dentist, who remote from cities runs his useful race, especially if he be young, the subject is almost *terra incognita.*—STEWART J. SPENCE.

A RADICAL, SIMPLE, AND SUCCESSFUL TREATMENT OF TEETH ASSOCIATED WITH PUTRID PULPS, WITHOUT A FISTULOUS OPENING.—With the older portion of the profession, and not a small part of the younger, this class of cases has been looked upon as the *bête noir* of practice. All kinds of methods have been adopted to lessen the distressing results occasioned by empirical practices of the past. Patients were wont to be told that they must expect a swollen face; if it did not occur, it was their good fortune.

Now, I wish to detail a demonstrated and successful practice with these cases. In opening into the pulpless tooth, associate with the instrument used carbolic acid, full strength. After securing an opening sufficient for preparing the pulp-chamber and canals for filling, clean this territory as thoroughly as practicable, using a bur or drill, if enlargement is deemed necessary. In straight canals, or nearly so, use in the engine a long, flexible reamer suited to the diameter of the canal. With care and delicacy this can be used to the very apex. Then prepare a piece of red cedar (I suggest this wood because of its color giving a line of definition to follow), which will follow the canal, and is useful especially when the root is being prepared for crown-setting, conforming to the size of the canal as nearly as may be, although it is capable of being compressed. It will give no difficulty if it approximates to the size. Dip this in carbolic acid, and delicately tap it into the canal to its full length. This is to be the treatment of the coming dentist. There need be no anxiety whatever, if this plan is intelligently adhered to.

Now the why comes in. The relation of atmospheric air in such cases invites our attention. The mischief resides in this as an exciting cause. We are told that the air is full of a low order of animal organisms, and that they are prolific in any territory in which they can find pasturage; like ourselves they live on food. Experimenters tell us that they attack all territory in condition to produce the proper food, and thrive until their pasturage is exhausted. The inflammatory condition brought about in the cases of which we are treating originates from excitation, the result of molecular action. The progress of combustion is supported by contact with common air, and is also the result of molecular action. In the coal-pit, air is only allowed to aid in the combustion sufficiently to keep in action the process of carbonizing the wood—making charcoal; if allowed to come

in in undue proportions, the degree of molecular action is raised to such intensity —heat is generated to such a degree—that it reduces the wood to an ash. Now, in my judgment, the excitation caused by the admission of air to this smouldering condition of smothered combustion in the pulp-chamber is awakened to an increased activity by the support that resides in the elements (oxygen and hydrogen) of the air, and the inflammation is awakened to increased activity and a larger territory becomes involved. It is well known that very frequently in the sudden breaking of a bad egg an explosion occurs, with a decided noise or report, and an odor of sulphuret of hydrogen is instantly discovered by the organs of smell. The elements contained in the air suddenly combine with this pent-up inflammation of animal matter, or fire, and an explosion is the result. This also is the result of molecular action, and on the same principle as the ignition of gunpowder. It is claimed by many that the organisms alluded to are the primal *cause* of the trouble that we meet with in practice, and it is considered plausible by many, from the fact that we get such good results from the use of the antiseptic, which is said to destroy this animal life, and without it we do not get such good results.

What does the carbolic acid do? It produces a carbolate of albumen, which is formed over the unprotected territory, and an undue amount of air is kept out by the immediate stopping; the process of normal combustion or inflammation is allowed to go on, and the normal action is sustained. It is a well-known fact that thousands of cavities in teeth have been filled with and without the use of antiseptics, and a certain amount of success has been attained by each method. Although it has been claimed that experiments have proved that teeth have been filled with the association of an antiseptic—carbolic acid—and there was no return of caries, and that without its use the opposite has been the result; I will not argue this at all, but invite discussion from those who can throw more light upon the question.—G. A. MILLS.

As the subject of pivoting is now the topic of general interest and discussion in the societies and journals, it may interest some to know how invention helps mother necessity to overcome difficulty when one is in a far country and away from the friendly dental depot.

An English tourist of the rushing type called in and wanted a lateral pivot-tooth inserted, on short notice, on a root from which he had recently lost a pivot-crown. On looking over my stock of teeth, including various styles of pivot-teeth, nothing was found suitable except an ordinary S. S. W. rubber-tooth. The shoulder on this between the point and pins had to be ground off to accommodate it to the bite, and when this was arranged I proceeded to cut a strip of thin gold plate and fit it by bending to make a collar for the root. This being done approximately, it was taken off, shortened a little, and soldered and polished, and on applying to the neck of the root and pressing on with some force, was found to be very firm in place. The rubber-dam being adjusted to central and cuspid and over the slightly projecting gold band, the root was dried out, prepared, and a triangular pivot of platinum fitted loosely to the root, made pointed, and roughened by pressing with serrated jaws of pliers, and secured with soft, quick-setting oxyphosphate. All the cement which pressed out was cut away, and the pivot-crown pressed into a little warmed gutta-percha between the gold band and pivot. With narrow pointed pliers the two round-headed pins were pressed firmly against and brought partly around the pivot, securing the crown firmly in place. Now, all the space at the back of the pivot to the encircling gold band and over and around the pins and pivot was filled and contoured with amalgam, which completed the

operation. As the other incisors were all filled with gold at the labio-gingival portion, I left my gold band much broader and stronger in front than otherwise would have been allowable. This operation seems to be perfectly satisfactory as regards strength and durability, and was done in so short a time that I thought it might contain a hint or two to some one else under similar circumstances. I had some time before used a rubber-pinned cuspid to replace the outer cusp of a first bicuspid of which the inner cusp was still standing, clasping the round-headed pins around the round platinum pivot in the root, and filling the space around the pivot and pins and between the artificial and natural cusps with amalgam, and it has done good service.—L. C. B., *Switzerland.*

To the Editor of the Dental Cosmos:

I read the Dental Cosmos with great interest, and have derived much benefit from it. In your report (in the April number for this year) of the meeting of the First District Dental Society, State of New York, I notice that Dr. Atkinson speaks very strongly against replantation. He also says he has never seen a pulpless tooth replanted with final success. Now, I should like to mention one or two cases which I have seen. In the first case, about six years ago, I put a large amalgam stopping into a lower first molar, for a girl aged about sixteen. A week after the operation she came back with the tooth very painful; evidently there was an abscess forming. I extracted the tooth, cleaned it, took about the sixteenth of an inch off the end of each root and replanted it at once. It was slightly painful for five or six days. Since then she has had no trouble with it, and there has never been any fistula, nor any discharge after the first six days.

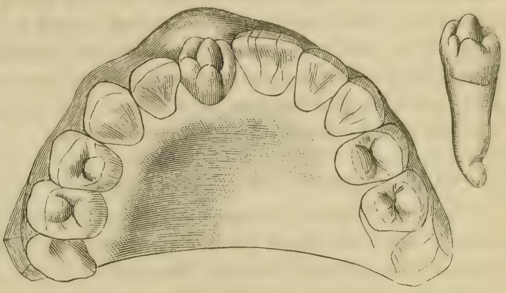
I have had four similar cases since, and have treated them in the same way. There has been no fistula with any of them, nor in any case has there been any trouble after the first six days. I think this plan is less troublesome to both operator and patient than removing the stopping and having to treat the tooth perhaps for weeks before it can be got into fit condition to restop.

In the same number of the Dental Cosmos, in the proceedings of the New York Odontological Society, Dr. Baxter, of Albany, mentions a case of loss of sensation after treating an abscess at the root of a lower second molar. I had a similar experience from the extraction of a wisdom-tooth in the lower jaw. The tooth was very large and the root long. After the extraction the patient complained that he could not feel anything from the center of the lower lip to the ramus of the jaw; he could not even tell whether a thing was hot or cold if it was placed against the side of the face. I had not even heard of a similar case before, and used no treatment, but sensation gradually returned in about six weeks.

I should like to mention while I am writing that I have found iron bolts very unsatisfactory for vulcanite flasks. They wear out too quickly altogether. I have had some gun-metal ones made and have now had them in use for three years, and they are still as good as new. These bolts are for the Star Reversible flasks. They were cast to shape and screw cut without their being filed up. The cost is the same as for iron ones, sixteen cents each. I always have my flasks and bolts scoured with a hard brush, soap, and coarse pumice each time they are used, even if I have to do it myself. It is worth the trouble, as they are so nice and clean to work with. It does not take long. A smart boy can do six in from fifteen to twenty minutes, if they are done every time, but it would take half a day to do the same number if they are allowed to get as black as a pot before you start cleaning them. Horace Robinson, *Dental Surgeon*, *Dunedin*, *New Zealand*, *August* 7, 1883.

To the Editor of the Dental Cosmos:

I send herewith the cast of a mouth and a tooth which I recently extracted. The case is interesting in several particulars. The patient is a young man, twenty years of age. The history, as follows, is verified by both parents and by an older brother: At fourteen years of age he had both of the permanent central incisors "knocked clean out," and they were not replaced. About two years after the accident, two teeth erupted in the place of those lost,—one, the perfectly formed left central; the other, the multi-cuspid tooth accompanying. About four months ago he discovered a fullness of the gum above the mongrel tooth. I extracted the specimen sent, when an examination fully satisfied me of the presence of a perfectly formed central incisor, a little broader than its fellow. Here, then, is plainly the fourth tooth being erupted in the same spot. The regularity of the arch forbids the idea of either of them being supernumerary.—C. B. Knowlton, *Belden, O.*



To Clean Impression Cups.—These articles are usually the dirtiest-*looking* appliances about the office. They can be made presentable as follows: Remove all particles of wax by dipping in boiling water and wiping with paper or old cloth; then rub them with hydrargyrum cum creta (mercury with chalk) found at any drug store, and used dry, or nearly so. The chalk removes all adherent particles, and the mercury is deposited upon the cup. Lay them aside a few minutes until the shiny look of the mercury has disappeared; then rub them with the brush-wheel on the lathe, when they will very speedily take and retain a polish. It is done very quickly, and they look bright and clean when finished.—
—A. Morsman.

Fatal Hemorrhage from Tooth-Extraction.—On the morning of September 25, I extracted the second right superior molar, which was badly decayed, for a young man, aged twenty-six, a native of Northumberland, England, who died this morning of hemorrhage from the socket of the extracted tooth, having lived one week after the operation. His family history showed a marked hemorrhagic diathesis, though confined to the male members of the family; the father, two uncles, and a cousin of the patient having died of hemorrhage from wounds, while the patient had twice suffered severe hemorrhage from trifling wounds. He had had teeth extracted previously, but in neither case had the hemorrhage, though prolonged, been serious. The patient was a Mormon, and, according to the tenets of his faith, rejected all medical or surgical treatment, which, if submitted to as advised, would, in all probability, have saved his life.—J. W. Hitchcock, *Salt Lake City.*

I recently removed, with considerable difficulty, from the superior maxilla of an English lady five teeth,—three molars, one bicuspid, and one cuspid. Every root of each molar was exostosed to within one-eighth of an inch of the crown; the thickness of the roots was more than double that of a normal root. The bicuspid root was enlarged for fully one-half its length, and the root of the cuspid

slightly enlarged. The patient had suffered extreme pain at different times, and the removal of the teeth seemed necessary, although, with one exception, they were comparatively sound.—HENRY E. JOHNSON, D.D.S.

RECOGNIZING that the creeping period of dentistry may be regarded as now merging into the walking period, and feeling that it would be safer that it should walk with tolerable firmness before it begins to run, I have read, with peculiar interest, the *minimum* standard of questions proposed for candidates before State boards of dental examiners.

While I think the addition of "twenty-five per cent." to this minimum standard palpably needless under present or near future auspices, I also think that it would be of decided advantage if the "dentistry of to-day" could be informed as to the answers required for such questions as "From what class of tissues do tooth-germs originate?" "What is the best treatment for alveolar abscess?" "How does filling arrest the decay of the teeth?" etc., etc.

It seems to me that *answers* to such questions as these from any of the gentlemen of the question committee would either be of great benefit to those inquiring in these directions, or else *place on record* the views of some of those who are officially regarded as "examiners" in 1883, thus proving of value as land-marks for the "progressives" of the future.—J. FOSTER FLAGG.

IODOFORM IN DENTISTRY.—In the October number of the DENTAL COSMOS there appeared two articles which, quite without intention, convey a decidedly erroneous impression: I refer to the article on "Iodoform in Dentistry," under the head of Original Communications, and to the paragraph on the same subject in Hints and Queries. From the reputation and standing of the writers, one would naturally infer that iodoform as a dental medicament was almost entirely unknown in the United States, and that only in Germany had any experimental work been done in connection with it.

This, in point of fact, is not the case. Four years ago I, as a student of the Philadelphia Dental College, listened to lectures in which mention was made of iodoform in its dental relations;—special attention was called to its value in the treatment of pulpless teeth, and the following formula was given as being one in which the disagreeable odor is largely overcome:

℞.—Iodoform, 10 grs.
Tannic acid, 3 grs.
Glycerin, 15 drops.

Rub the iodoform to a flour in a small mortar, add the tannic acid, mix well, and then add the glycerin.

It was also further pointed out that age would still further diminish the slight smell of iodoform in this preparation, and experience fully confirms this teaching. One drop of oil of cinnamon added to the above mixture, has the effect of *entirely* concealing the unpleasant odor.

Since the date I mention, the use of iodoform has been regularly taught in the above-named college, and it is ranked as one of the standard dental medicaments in the lectures from the chair of therapeutics. Under these circumstances, it is evident that already a large number of gentlemen have entered upon their professional career with very definite ideas as to the value of "iodoform in dentistry." —A. B. HARROWER.

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ORIGINAL COMMUNICATIONS.

THE SCIENTIFIC METHOD IN DENTISTRY.

(An Address delivered before the Pennsylvania State Dental Society, July 31, 1883.)

BY THE PRESIDENT, JESSE C. GREEN, D.D.S., WEST CHESTER, PENNSYLVANIA.

In entering upon the duties to which you have called me, I am forced by a fitting custom to extend the word of thanks into the formality of an opening address—a custom which would have been cheerfully honored in the breach, were it not that I have something serious to add to the sincerity of thanks and the gladness of greeting.

I have no novelties, either in doctrine or in practice, to lay before you. Dental failures and successes, dental histories and prognostications, charges and countercharges of individuals, classes, and schools—all these I leave to the specialists of the floor. It is not what we know, but *how to know;* not what we think, but how to think; not my opinion, but that which gives me a right to hold an opinion—these things I ask you to consider with me.

"Every man I meet is my master in some point, and in that I learn of him," says Emerson. But it is something both for him and for me to know just in what point, and by what right he is my master. In some degree, in this direction or in that, we are all erratic, all inaccurate, all prejudiced, all impulsive, all self-opinionated, and all unreasonable. "Socrates," says Prof. Goodwin, "felt that the great enemy of truth in Athens was not ignorance, pure and simple—this he could leave to schoolmasters to enlighten—but ignorance puffed up with the conceit of knowledge."

We find it difficult to observe a simple phenomenon, to record faithfully a single fact, to acknowledge openly an error. If we utter opinions, let us show that we have a right to hold, not this nor that, but *any* opinion. Having eyes, it is possible that we see not; having ears, it is possible that we hear not. I may see the

bow and yet not apprehend the shining sun nor the falling rain. A score of truths may be locked up in the record of one fact.

It has been well said, that he who sees most and can best tell what he sees, is the greatest man. But this is not to be done without method and deliberate and sincere purpose. We must be dispassionate and yet earnest. To be open to conviction is the permanent state of the truth-seeker.

We may debate, we may discuss, we may contend; but as a scientific body our aim is single—and that aim is SCIENCE. Among us we have stores of knowledge, handfuls of practical skill, grace in our art, and conscience in our principles; but with all this, we lack, in some measure at least, that which can make our knowledge most effective and our practice most successful. We need more of

> "The power of arranging, combining discerning,
> Digesting the masses we learn into learning."

And to this end, I ask you to consider the only sure road, the SCIENTIFIC METHOD.

After all, this is but the common-sense way. For common-sense is but a kind of unlearned, unstudied, innate science; and science is but an artificially elaborated and recorded common-sense. The one is the uncut, the other the cut diamond. We cannot all be skilled lapidaries; but the consciousness that I am not in the highest sense a *scientist* does not diminish my regard for science, nor my desire to advance by its clear-cut methods.

A man may be poetical in mood without being a poet; he may be scholarly in diction without distinction in special scholarship; he may be scientific in his tastes without making a great invention; methodical, logical, accurate he may be in his habits of thought, without naming a metal or discovering a comet. It is sufficient to assert that a scrupulous regard for the Scientific Method would relieve us from a prodigious amount of jejune talk, and spare us that mental distress which is more fatiguing than labor.

What then constitutes science? What is this method which has such restraining, guiding, corrective, advancing power? Science is methodized thought, classified truth, the reduction of knowledge to its lowest terms. It arises from the discovery of identity amid diversity. "In every act of inference or scientific method," says Jevons, "we are engaged about a certain identity, sameness, similarity, likeness, resemblance, analogy, equivalence, or equality apparent between two objects. It is doubtful whether an entirely isolated phenomenon could present itself to our notice, since there must always be a contrast between object and object to awaken our consciousness. * * * * The whole value of science consists in the

power which it confers of applying to one object the knowledge acquired from like objects; and it is only so far, therefore, as we can discover and register resemblances or differences that we can turn our observations to account." This definition may seem vague and abstract; but the more it is contemplated the more pithy will it appear. To "discover and register resemblances and differences;" this is the key-note and motive of all science—of all knowledge in fact; it is what the new-born infant has to do, and the scientist differs from the infant in knowing just how to do this to the best advantage and with the least effort. The infant advances only when it strikes the scientific method among its blind gropings. "Accordingly," continues Jevons, "the value of classification is coëxtensive with the value of science and general reasoning. Whenever we form a class we reduce multiplicity to unity, and detect, as Plato said, 'the one in the many.' The result of such classification is generalized knowledge, as distinguished from the direct and sensuous knowledge of particular facts. The facilitation and abbreviation of mental labor is at the bottom of all mental progress. The reasoning faculties of Newton were not different in qualitative character from those of a plowman; the difference lay in the extent to which they were exerted, and the number of facts which could be treated. Every thinking being generalizes more or less, but it is the depth and extent of his generalizations which distinguish the philosopher."

If this detection of identities, this classifying, be called the soul of science, then the body of science must be the record of its accumulated facts, and the laws formulated from the observation of them. Some bodily material must be gathered together before the soul is breathed into it—that is, facts must be gathered by observation and experiment. Experiment, indeed, is only based upon presupposition. Any observation is facilitated by our knowing what to look for. The accurate observer will often note that in looking for one result he finds another, or finds that one, and more, too, of an unexpected kind. He becomes prophetic. Here is where most observers fail. They fancy they see not what they do see or should see, but what they wanted to see.

It is surprising how few people are able to see truly, and truly tell what they have seen. I am not sure but that this is the rarest of human attainments; and yet it is within the reach of every one, in some degree at least. It is the *sine qua non* of science, the anchor of its stability. Let us learn to observe and record truly and without bias, fear, or favor. Scientists we may not be, but good, careful, accurate reporters we might at least aspire to be. And here lies more than half of my message. Having observed well

and accumulated facts, we may proceed to reason upon them.

Science marks its advances in sound logic; but it makes its stupendous leaps, its high flights upon the wings of the imagination. We call it hypothesis then, and hypothesis and poetry are nearly allied. The Laplaces and Newtons and Faradays are the Dantes and Miltons of science. But as Milton could not express an epic without using the language of the people, so, Newton could not frame an hypothesis or establish a law without a foundation of such simple facts as every peasant had observed.

There are few among us who can be expected to employ the Scientific Method in its entirety. This includes many conditions; it is subject to deductions, mathematical reasonings, concretes, abstracts, combinations, permutations, probabilities, measurements, means, averages, laws of error. Then there are approximations, hypotheses, predictions, generalizations, analogies, exceptional phenomena, classifications, and finally a calculable appreciation of the inadequacy of our means and the paucity of our facts; of the limits and restrictions of science—upon all this it would be out of place here to enter, even were we so disposed.

My purpose is not to ask anyone to climb the heights of scientific hypothesis, nor to descend to the depths of profound investigation; but if any or all of us could be impressed with the necessity of contributing to the body of recorded facts; if we could he henceforth induced to *observe accurately* and to *record trustworthily*, much would thereby be accomplished. "The perfect archer calls the deer his own while yet the shaft is whistling;" but mark that only in proportion to the perfection of his aim can the archer call the free deer his own.

It is the eye of the archer we need. To observe even a simple fact from all sides is not easy; to record it truthfully is not more easy. "It is exceedingly rare," says Jevons, "to find persons who can with perfect fairness estimate and register facts for and against their own peculiar views and theories. Among uncultivated observers, the tendency to remark favorable and forget unfavorable events, is so great that no reliance is to be placed on their supposed observations. * * * The whole race of prophets and quacks live upon the overwhelming effect of one success, compared with hundreds of failures which are unmentioned and forgotten. Bacon says, 'men mark when they hit and never mark when they miss.'"

In observation of fact science begins and ends. Fact is the test of fact. We record an observation, but the truth of the record must stand the test of other facts before and after. Facts are the beginning and the end. Not as professional men merely, but in the commonplaces of life, will an accurate method be of incalculable value

to us and those who succeed us. Says Jevons, "no small part of the experience actually employed in science is acquired without any distinct purpose. We cannot use the eyes without gathering some facts which may prove useful. Every great branch of science has generally taken its first rise from an accidental observation. Bartholinus thus first discovered double refraction in Iceland spar; Galvani noticed the twitching of a frog's leg; Malus unintentionally examined with a double refracting substance light reflected from distant windows. * * * * As a general rule, we shall not know in what direction to look for a great body of phenomena widely different from those familiar to us. Chance, then, must give us the starting-point; but one *accidental observation well used may lead us to make thousands of observations in an intentional and organized manner*, and thus a science may be gradually worked out from the smallest opening."

Well, we will soon find that accurate observation begets accurate recording, and this in turn soon develops the reasoning faculty. "Upon the foundation of carefully observed and well-assorted facts," says Blackie, "the mind proceeds to build a more subtle substance by the process we call reasoning. We would know not only *that* things are so and so, but *how* they are, and *for what purpose* they are. * * * * There are few human beings so contentedly superficial as to feed habitually on the knowledge of mere unexplained facts; on the contrary, as we find every day, the ready assumption of any cause for a fact rather than remain content with none, affords ample proof that the search for causes is characteristic of every normal human intellect. What young men have chiefly to look to in this matter, is to avoid being imposed on by the *easy habit of taking an accidental sequence or circumstance for a real cause.*"

How much of trouble, not only in professional, but personal, domestic, social, and national life is due first to loose habits of observation and untrustworthy records thereof, and secondly to the coupling of antecedent and subsequent, as though they were cause and effect. If cooler weather follows the summer shower the coolness is the *cause* of the shower and not the effect of it. Says Blackie again, "The politician who fails in solving a political problem, fails not from the uncertainty of the science, but either from an imperfect knowledge of the facts, or from the action of passions and interests which prevent him from making a just appreciation of the facts."

Here is the whole subject in a nutshell. The uncertainties of the Scientific Method need give us no uneasiness, if only we make sure that we have a real knowledge of facts, and that we can so eliminate our personality of interest as to insure accurate recording and prevent unreliable reasoning upon the premises thus furnished. So it

were well to cultivate sight for observation, language for recording, and the reasoning or logical faculty for the establishment of those generalizations or steps in knowledge by which we are enabled to ascend.

"Good reasoning," says Lewes, "is the ideal assemblage of facts and their representations to the mind in the order of their actual series. It is seeing with the mind's eye. Bad reasoning will always be found to depend on some of the objects *not being mentally present; some links in the chain are dropped or overlooked.* Bad reasoning is imperfect representation."

In conclusion, let us have method in our thoughts, method in our speech, method in our deeds. Thus alone shall we progress. Due attention to the principles I have so lightly touched upon will work wonders for us, and for those who depend upon us. Truly, then, we have something yet to learn and a way to get that learning. We are not here merely to exhibit either originality or eloquence. We assemble as a scientific body to contribute to and profit by our science. Upon the recorded observations of the individual we are to generalize and formulate new principles or to confirm old ones, and then from a more elevated plane of truth to go forth again to "observe, compare, reflect, record."

Finally, a conscientious regard for this Scientific Method will sharpen our sight, quicken our perceptions, sweeten our tempers, make us more exact, more truthful, more swift to hear, more slow to speak; above all, it will prove us to be reasoning creatures by making us in all things, at all times, and towards all men, *more reasonable.* Thus shall we disarm prejudice, correct hasty criticism, prune exaggerations, eliminate error, silence bickerings, challenge sciolism, and, sacrificing personal ambitions, deal with facts rather than with men. Thus, too, shall the application of science in dentistry contribute toward the better and fuller establishment of it as a science as well as a practice.

A CONSIDERATION OF THE MERITS AND CLAIMS OF ARTIFICIAL CROWN- AND BRIDGE-WORK.

BY J. L. WILLIAMS, NEW HAVEN, CONNECTICUT.

In the lives of most of us there sometimes come moments when we catch glimpses of the grand possibilities of life. We feel that we are fettered by old traditions and hedged about by old customs. We would, with one sweep of the hand, brush away these cobwebs of time from about us, and go up to the mountain-top, where the blood may leap under the rejuvenating influence of a purer atmo-

sphere, and the sunshine of eternal truth may rest upon our heads. But, alas, "our feet still cling to the heavy clay!" The vision departs and we go plodding on as before. But these moments of mental elevation have a deep significance. They are the intimations of the working of that internal evolutionary force which shall evolve from the present man a superior being. They are the first faint fore-gleams of a day which shall witness the triumph of order over disorder in the mind of man; when, out of that which is now chaotic and undeveloped, there shall be wrought the forces which shall bring man into harmony with the divine order of the universe.

I am led to preface the paper which I am announced to read in this way, because of the prejudice which I so frequently meet, where I expected to find liberality or, at least, tolerance. This tendency to plod on in old ways, to cling to old thoughts, forms, and methods, has always been the greatest hindrance to all true progress. But if it is age and the impress of time which gives a thing value, we should bear in mind that this *present* moment witnesses all the experience of the past. *This* is the oldest period of time in the history of the world and is laden and fragrant with all that has gone before.

Gentlemen, we are members of a profession which contains within the range of its possibilities the power of bestowing unlimited good upon humanity. Shall we live always close to our highest conception of what is possible and so, at last, surely come to see our ideal to some extent realized, or shall we drift with the tide, and be blown about by the winds of prejudice, until haply, if we are not stranded, we may find our life energies have been wasted in toiling for that which brings no satisfactory return?

I assume it to be a self-evident truth, that the true purpose of the conscientious dentist should be the exercise of his best efforts for the conservation of those conditions in the mouth which are in harmony with the laws which govern the organism as a unity.

That continued integrity of the body which we designate by the term health is primarily dependent upon the digestion and assimilation of food-material. Perfect digestion must begin in the mouth with the proper mastication of food. The preservation of the natural teeth, therefore, or the maintenance of the mouth in that condition which we find when there are healthy, well-preserved teeth, is the end toward which our energies as specialists should be directed.

It is my purpose to describe in this paper the principles of a mechanical appliance, or, to speak somewhat more elegantly, a form of dental prosthesis, which is capable of being made of immeasurably greater value to humanity in the preservation of that condition of the mouth of which I have just spoken, than all other forms combined.

I make this statement upon the experience which I have gained by giving this work my almost exclusive attention for the past year, during which time I have tested it under almost every conceivable condition. I refer to the so-called "Crown- and Bridge-Work," concerning which so much has been said and so little is really known. I am certain that so far as the "bridge-work" is concerned, no one has yet spoken or written upon the subject who has had sufficient experience to speak or write even intelligently.

The fact that patents have been granted for this work, and that it has been extensively advertised in a manner not altogether in keeping with the generally recognized standard of professional dignity; that the claims made by those who have thus advertised have been somewhat exaggerated; that the lack of that wide experience which is necessary to the successful accomplishment of an operation requiring the consentaneous observance of so many conditions—an experience which can only be gained by a long series of experiments—has sometimes made failure inevitable; that the failures are always known and well advertised, while the successes are quietly enjoyed by grateful patients—these and many other reasons may be offered in explanation of the existing prejudice among many of the leading men in the profession against bridge-work.

While it is undoubtedly true that the work will never be extensively done, for two reasons: first, because of its expense; and secondly, because (I speak from experience but with the utmost respect) the proportionate number of dentists who possess the manipulative dexterity and mechanical skill requisite to the attainment of a high degree of success in this work is not large; yet, by those who, appreciating the value of that which most closely approximates nature's own work, are willing to pay for efforts in the highest direction, and by those who possess the necessary skill and judgment for the successful accomplishment of the work, it will be esteemed one of the most beautiful and useful operations of modern dentistry.

I propose, in this paper, to answer some of the objections which have been urged against this work; and in so doing I desire only to consider the intrinsic merit of the work itself. To him who desires to "prove all things, and hold fast that which is good," it matters but little whether the "light of the world" comes from Nazareth or Jerusalem, so that it only comes. I have only feelings of pity for the man who, as my good friend Dr. Atkinson says, "will persistently stand with his back toward the source of light, and, gazing at the darkness of his own shadow, be constantly saying, 'alas, how dark it seems!'"

One of the objections most frequently urged against an extensive

use of either the bridge-work or single crowns, may be formulated about as follows: After the pulp in a tooth is devitalized the vitality of the tooth has, to a large extent, been destroyed, and is to that extent a foreign substance, and nature will make an effort to rid herself of it. This erroneous view arises either from a lack of experience, or a want of knowledge concerning the physiological relationship of the root of a tooth to its surrounding tissues, or both. The extent to which a pulpless tooth or root may be said to be in a pathological state depends upon many past and present conditions. It depends upon the circumstances and conditions attending the death of the pulp; the length of time that has elapsed since its destruction; the condition of the tissues surrounding the root; and, what is too infrequently taken into consideration, the status of the systemic health. If the pulp is destroyed by some powerful, persistent, penetrating medicinal agent like arsenic, the secondary action of which continues long after its primary action has ceased, it is hardly possible to say to what extent the vitality of the root may not be destroyed. If, added to the action of some powerful medicinal agent, the pulp-chamber has been left open for a greater or less length of time, allowing the organisms of putrefaction to enter and take up an abiding-place there, thus producing decomposed matters which are absorbed into the root-substance; and if the pericemental membrane has become diseased by irritation following the accumulation of tartar; and if the vitality or the combined forces of systemic life have become weakened, and we have that condition in which bioplasm is rapidly converted into pus: then the probabilities of success in the placing of crown- or bridge-work are very much reduced. But if the pulp has been removed by true surgical methods, as it may always be from the sixteen anterior teeth, and frequently from the molars, and the root properly treated and plugged at once, I believe that the physiological condition and relation of that portion of the root which is in contact with the surrounding pericementum remains unchanged.

I am aware that this will sound like a radical statement to those who have accepted the generally received theories; but it is based upon a careful study of the anatomy and physiology of the root of a tooth and its investing membrane. We may better understand the minute anatomy and physiology of a tooth by a brief reference to its embryological history. A tooth is formed from three distinct genetic sources: The enamel from the enamel-organ, which is the first part to appear; the dentine from the dentinal germ, which makes its appearance soon after the commencing formation of the enamel-organ; not until the crown of the tooth is almost completely developed, does the layer of cells, closely resembling osteo-

blasts, from which the cementum is formed, become differentiated. The cementum is formed upon the dentine, from or by the membrane which afterwards becomes the pericementum. I refer to these points to remind you that throughout its period of formation, as well as after its complete development, the cementum, that portion of the tooth which is united to the investing membrane, receives its nutritive supply from a source quite distinct from and independent of that which supplies the dentine. The removal of the pulp, therefore, cuts off only that nutritive supply necessary for the continued integrity of the dentine. The life and vitality of the cementum remain intact and uninjured, and even the dentine may, and undoubtedly does, retain a certain amount of vitality, for something analogous to a healing process takes place at the ends of the broken fibrillæ next to the pulp-chamber, and by one of those wonderful provisional conditions which we so often meet with in the economy of the animal kingdom, nature reverses or changes the origin of nutritive supply, and the material for maintaining the continued vitality of the dentine comes through the cementum. In the minute anatomy of a tooth we find very strong confirmatory evidence of this view. The dentinal fibrillæ everywhere connect with the prolongations of the cement-corpuscles. So perfect is this anastomosis in many teeth that it is quite impossible to say just where the dentine ends and the cementum begins. The ligation of a small artery in any part of the body necessitates a much greater change in the currents of nutritive supply than this change of which I am speaking. After the completion of the formation of the enamel, we have an illustration of a change quite analogous to this. The material for the formation of the enamel while *in embryo* comes through the enamel-organ, which is a true secreting organ, from an intricate plexus of blood-vessels surrounding the tooth-sac. After the completion of the formation of enamel, the enamel-organ becomes obliterated, and the bioplasson net-work, which has become joined *to* and continuous *with* that of the dentine, becomes the channel through which the nutritive supply for the continued integrity of the enamel is conveyed.

In the change which occurs in the circulation of a child at the moment of birth we have another illustration of the wonderful manner in which nature changes her method of supplying the necessary conditions of life. But as it may be objected that this change comes within the limits of normal life, I will not urge the point, but will call your attention to some of the wonderful ways in which nature provides for accidental emergencies in the economy of the human organism. It is an erroneous notion to suppose that blood in the interior of a tooth is necessary to the continued life of

the dentine. For proof of this I need only refer you to the commencement and advance in growth of many organs in the embryo before the formation of blood-vessels in those parts. In fact, the formation of vessels seems to be a secondary matter.

"The first perfection of the economy of the human body is in the exactitude with which its several parts are balanced in their powers; and the mutual adaptation thus established is continued, in ordinary life, by the nutrition of each part being regulated according to a law of direct proportion to the quantity of work that each discharges. But when the external conditions of life vary, and require for the maintenance of health varying amounts of function to be discharged by one or more parts; and, still more, when disease disturbs the functional relations of any part to the rest, then each part displays a capacity of adaptation to the new conditions in which it is placed."

You will bear with me if I dwell at considerable length upon these points, for I wish to place my argument in the strongest possible light, because the thoughts and reasonings which I am presenting for your consideration are not only new but opposed to the time-honored teachings of our profession.

Every practicing dentist has observed that a tooth which is removed from contact with the fluids of the mouth changes color. This change in color is largely the result of the evaporation of the water from the organic portion of the tooth. Now if the apical foramen of such a tooth be closed, and the tooth be then placed in water, or preferably, glycerin and water, in a short time it will regain nearly its original color, and at the same time it will be found that it has increased in weight. This means, of course, that the entire tooth has absorbed, from the surface, a certain quantity of the fluid, and this fluid has penetrated every part of the solid structure of the tooth. Will anyone doubt, with these facts in view, that when the tooth is in position in the jaw, and surrounded by all the delicate adjustments furnished by nature, there may be a circulation of nutrient fluids throughout the entire root of the tooth after the removal of the pulp?

The change of condition which is necessary to the continuance of a certain degree of life in the root of a tooth after the destruction of the pulp, is not a phenomenon which need excite our credulity when we take into consideration the microscopic construction of the parts, and the many wonderful exhibitions of the powers of certain organisms to restore and repair lost or injured parts.

In the different forms of hydra it seems literally true that any minute portion which may be taken from the germ-mass may, after separation from the perfect body, reproduce or develop into a new

perfect form. Very many of the low forms of life possess this remarkable faculty of developing perfect individual forms from detached parts of the parent mass. In the insects and some of the higher forms of animal life we have numerous examples of the reparative power as shown in the reproduction of lost organs or members; such as legs, claws, a part of the body, the head, an eye, the tail, and the like.

Surgery furnishes an almost innumerable number of examples of the changes which are effected for the continued nutrition of a part after ligation of large and important blood-vessels.

We know of no stronger evidence of divine design in the construction of the human body than this capacity for action in events which are not only in the future but may never occur. Indeed, the probabilities of their occurrence are so low that should they ever happen they would be called accidents; and yet nature, or some power superior to nature, has provided for these possibilities.

Illustrations of these provisional adaptations of nature to changed conditions resulting from accident or otherwise might be multiplied indefinitely; but we think sufficient proof has been advanced to convince any reflecting mind that a pulpless tooth is still a living organ, maintaining a vital relationship to the surrounding tissues.

We have referred to the removal or destruction of the pulp by a surgical method as being best calculated to leave the root in the best possible condition for its future life and health. As the profession is probably not, to any extent, familiar with the method, I will describe it in detail. If it is desirable to remove the pulp from any of the sixteen anterior teeth, a groove should be ground across the labial and lingual surfaces, quite close to the margin of the gum, and just through the enamel or a little deeper, when there is not too much sensitiveness. Place the blades of a pair of excising forceps in these grooves, a little to one side of the center, and with a quick, dextrous closure cut off what remains of the crown. This will usually leave the pulp exposed at the point of its broadest diameter. An orange-wood point, which has been previously prepared as nearly as possible to correspond in size and shape with the pulp, is inserted into the canal beside it, and with one blow of the mallet is driven to the extremity of the root. The remains of the pulp will usually adhere to the wood on its withdrawal. If not, it can easily be removed with a. barbed broach. If the operation is performed in a bungling or indifferent manner, it may be made a painful one; but if skillfully executed it causes little or no pain. I speak from an extended experience, having performed the operation many times during the past few months. After the removal of the pulp the root may be filled in that manner which the experience of the ope-

rator has demonstrated as most successful in his hands. The one point of the utmost importance is that *it should be plugged at once.*

Ninety per cent. of the failures in the treatment of pulpless teeth arise from keeping the canal open when it should be closed. In my own practice I always plug the root with the orange-wood point above referred to, previously saturating it with carbolic acid. Experience has demonstrated that this is the most perfect filling that I can place in the root of a tooth, the wood being sufficiently compressible to allow it to adapt itself to any slight irregularity in the shape or direction of the canal.

A second objection urged against the bridge-work is, that the unnatural strain required of two or more roots in supporting a larger number of teeth will sooner or later result in the destruction of their attachment to the jaw. This objection assumes quite too much at the outset. It is not by any means certain that there is any increased strain or pressure upon roots supporting bridges. On the contrary, teeth which have become loose are frequently prevented from recovering their normal firmness by the constant mechanical irritation, which is prevented, to a large extent, when these teeth or roots are made the partial support of a bridge. I have, in many instances, observed loose teeth which careful treatment had failed to restore become quite firm when placed within the protecting embrace of a bridge. The reason for this is evident. The pressure or mechanical force required during mastication, which is frequently brought entirely upon two opposing teeth, is, in the use of a bridge, so equalized and distributed as to render far less liable the strain upon any one tooth.

Of course, it is necessary that a practical application of a knowledge of mechanical forces should be made in the mounting of crowns and bridges. In the case of a bridge of the six superior front teeth, if the lower incisors are directed outward and against the lingual surface of the crowns, there would be a constant tendency to throw the bridge outward. In such a case as this a square articulating shoulder should be formed on the lingual surface of the bridge. In cases of projecting incisors it is advisable in some instances to fit a gold crown over one or both of the first bicuspids. By attaching these gold crowns to the bridge the strain upon the canine roots is very much reduced. But in the consideration of this objection, as of all others, the knowledge gained by observation of actual cases in practice is of far more value than any amount of *a priori* reasoning. Many hundreds of these bridges are being worn with perfect comfort, and careful examinations fail to detect any evidence that the roots upon which the bridges are mounted are sustaining any injurious strain.

An objection which is, perhaps, mentioned more frequently than any other is thus referred to by Dr. James E. Dexter, in his article in the July number of the DENTAL COSMOS for the current year, on "The Cap Plate: A New Appliance in Mechanical Dentistry." He says: "But, as a practical fact, permanent bridges are simply the nastiest things ever made to do duty as substitutes for nature's work." Following this is half a page of unfounded assumptions and sweeping assertions which, to say the least, can hardly add anything to Dr. Dexter's reputation for candid, truthful statement, or a knowledge of what he is talking about. The most charitable thing which I can say concerning these statements is, that Dr. Dexter's opinion (if it can properly be called an opinion) is founded upon what he knows of a few cases, which were probably made by persons incompetent to undertake such operations. I have myself seen many such cases, but they in no way disprove the real merit of the work. The truth is, *a skillfully constructed and properly adapted bridge is one of the most elegant and cleanly operations in dentistry*, and is the most perfect substitute at present known for supplying the loss of the natural teeth. I think the eminent gentlemen who compose the Board of Censors for the State of New York will bear witness to the truthfulness of the above statement, as exemplified in the case of a full upper set of crown- and bridge-work which I presented at Albany last May.

Just as I am writing these lines a lady is in the office who has been wearing a lower bridge of ten teeth for several weeks. She has had an extended and varied experience with various dental operations and appliances, including a full upper set of teeth on platinum. While expressing her delight with the bridge operation, and without my having made any reference to the subject of cleanliness, she said: "I find it is so easy to keep the teeth clean; they really require less care than was necessary with my natural teeth." The statement is not an exaggerated one. It is true that any properly-made bridge can be kept clean with less effort than is required in the care of the natural teeth.

Dr. Dexter speaks of "crevices under backings, and the spaces under the bands or caps around or over the natural teeth (spaces which it is next to impossible ever to thoroughly and permanently eradicate)." I have to say in reply to this that no such spaces or crevices will ever exist in the work of a careful operator. Would Dr. Dexter speak of teeth mounted upon gold plates as the "nastiest things ever made to do duty as substitutes for nature's work?" He knows that "the spaces between the artificial teeth and crevices under backings" which "no brush, pick, wash, or other agent will practically affect" are much more extensive in such a piece of plate-work than in any bridge. The only spaces which may not be

perfectly closed are those between the upper part of the porcelains and the gold caps upon which they are mounted. But as there are rarely more than two or three such caps in any piece of bridge-work (the posterior ends being attached by entire gold crowns), the amount of space which may not be reached with a brush or floss silk is far less than in any piece of plate-work in which gum-teeth are used.

There are persons whom no amount of argument, advice, and instruction will induce to keep clean their natural teeth. Such persons would not keep a bridge or any other oral appliance clean; but no candid writer would think of making use of such an instance as an argument against the wearing of the artificial substitute.

But in the final broadside which Dr. Dexter discharges against the bridge-work, his total lack of familiarity with the work which he is criticising becomes ludicrously evident. He speaks of the very probable breakage of the porcelains, and "the almost absolute impossibility of renewing the broken teeth except at the cost of remaking the entire appliance (for it must generally be destroyed to be removed from its place)." Should a porcelain be broken from the bridge, there is not the slightest necessity for remaking, destroying, or removing the piece in order to renew the broken tooth. A new one may be readily fitted in a short time so that the work will be as strong and perfect in every way as it was before such an accident. But as the porcelains are now mounted it seems very probable that breakages will rarely occur, for they are almost perfectly protected from the possibility of strain.

The merits of crown- and bridge-work can probably be best maintained and all objections most effectually answered by a description of cases in actual practice. In this way the various practical difficulties to be overcome will appear, and the superior advantages of the completed work will be evident.

(To be continued.)

ALVEOLAR ABSCESS.

BY WM. H. ATKINSON, M.D., D.D.S., NEW YORK, N. Y.

(Read before the First District Dental Society, State of New York.)

We get our term "abscess" from the Latin *ab*, from, and *cedere*, to go; indicating the separation of tissue, thus forming a cell, pocket, or chasm in the flesh.

It will hence be seen that in perfect molecular change of the pabulum into tissue, abscess would be an impossibility.

At the points where pabulum changes to protoplasm and protoplasm to embryonic corpuscles, there is a possibility of gas being set

free by reason of an imperfect meeting of the demands of atomic affinities in requisite proportions to change pabulum into protoplasm and protoplasm into embryonic corpuscles without loss of balance of equation in molecular constitution.

In case hydrogen or sulphur be in excess or deficient to the demand for constructing these elements of tissue, hydrogen or sulphureted hydrogen may be set free by reason of the explosion of the molecules; thus pushing apart the normal protoplasm or embryonal corpuscles, and laying the foundation of an infinitesimal abscess.

In very moist, succulent, or scrofulous habits of body, multitudes of these little abscesses are formed, producing interruption of the nutrient currents, nerve-currents, and blood-currents of the locality. When an arrest of these currents takes control of a locality what is known as *stasis* is produced. Should active exercise or intelligent treatment be adopted at this stage resolution occurs and a return to health is established. This is brought about by the watery portion of the tissues and of the blood accumulating, in which accumulation the gaseous nuclei inducing the stasis may become dissolved to saturation, and then be absorbed.

This is the particular condition that is so eminently amenable to treatment by heat, cold, massage, plasters, bandages, magnetic and electric manipulations. These conditions are only appreciated by highly sensitive patients and intelligent and impressible practitioners. Where the stasis is not removed by any of these means, the so-called *exudates* add to the contents of these multilocular pockets until a reversal of the currents induces disruption of the elements of the tissues, presenting us with what is known as *pus*, of a quality comparable to the degree of debility of what is known as constitutional make-up.

In strumous habits of body the molecular changes are slow, and the abscesses are called *cold* abscesses. In better organizations they are very likely to assume an inflammatory character, and are known as *acute* abscesses.

Abscesses, then, may be said to be accidental cloacal tracts or reservoirs for the effete or poisonous products of the changed nutrient activity. It will thus appear that the abscess is an effort on the part of the bodily economy to establish adventitious channels through which the system may discharge from the body refuse parts of pabulum, excess of pabulum, or poisonous portions. This, is proved, to all who understand embryological metamorphosis, by the pointing of the abscess on the side of least resistance. When the resistance is equal on all sides of the abscess a tendency known as metastasis transfers the molecular disturbance to a more favorable locality holding strong bonds of sympathy with the territory first

invaded. This is called *translation* of the abscess and has given rise to what is denominated *counter-irritation* to cure these aberrations of nutrition. Over-work and under-rest or over-rest and under-work of the animal body are antecedents to the disturbance in tissue denominated abscessing.

What systemic causes may facilitate or induce alveolar abscess?

Constitutional weakness, from whatever source, reducing the resistance of the body to the effects of cold or exhaustion (Note 3).

What local causes may do the same?

Nutrient lesions from failure of nerve- or blood-currents, traumatic or mechanical lesions of all kinds, and lesions from local applications of poisons.

Is alveolar abscess always a result of or in connection with previous lesion of the tooth involved?

Not always. When it is from death of the pulp, its site is at the end of the root; but if from death of any portion of the alveolar wall, with a living pulp (the life of which should be conserved), its seat will be at the point of the dead tissue (Note 2).

Is alveolar abscess always a result or consequence of pericementitis?

When from dead pulp, yes. When from death of alveolar process, no (Note 1).

Is alveolar abscess sometimes a sequel or result of caries in a tooth, without previous pericementitis?

Never (Note 2).

In what diathesis is alveolar abscess most likely to occur, and why?

The strumous, from debility of functioning power (Note 3).

What variations of cause will lead alveolar abscess to select the side or end of a root, dead *bone*, and dead *pulp* respectively (Note 4)? State kinds of alveolar abscess.

There is only one kind, but many localities (Note 5).

What conditions will be necessary to cause an alveolar abscess to assume a chronic character?

Continued debility, and an open vent* (Note 6).

State, in order of occurrence, symptoms of *acute* alveolar abscess?

First, slight uneasiness, relieved by closure of the occluding tooth upon the one involved, which uneasiness rapidly passes into actual pain, soon amounting to agony as the destructive inflammatory processes progress.

State in same way those of chronic alveolar abscess?

A chronic is an unhealed acute abscess.

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* A better answer to this question will be found under the query as to prognosis and sequelæ of acute alveolar abscess in this paper.—EDITOR PROCEEDINGS.

Make comparative diagnosis between acute alveolar abscess and inflammation of pulp?

Acute alveolar abscess always involves tenderness of the tooth in the socket from pericementitis, while in pulpitis the pain is pronounced in the pulp, with no tenderness of the pericementum. Hot or cold applications appease or aggravate the pain where the pulp is involved, and thus differentiate pulpitis from pericementitis.

Make comparative diagnosis between chronic alveolar abscess and chronic pericementitis?

Tenderness upon pressure without fistula or discharge and generally with looseness of the tooth indicates chronic pericementitis. An open fistula, with or without perceptible discharge, indicates chronic abscess.

State progress of acute alveolar abscess, including methods and directions of pointing?

Irritation, pain, suppuration, and pointing in line of least resistance.

State progress of chronic alveolar abscess?

Persistent discharge, or alternations of acute and chronic symptoms in suppurations and partial healings.

State prognosis, and sequelæ, of acute alveolar abscess, if allowed to run its course?

Complete spontaneous cure, where all foreign matter is expelled. Takes on the chronic form when all foreign matter is not expelled. The sequelæ, in the first case, will be restoration to health; in the second, various degrees of wasting of the tissue in the locality.

State same of chronic alveolar abscess.

Persists, so long as effete matters generate at site of lesion.

Given an ordinary case of acute alveolar abscess, state your treatment in detail, if taken in the first stages?

Depletion by emetics, cathartics, or bleeding from a vein, lessening the blood-tension in the general circulation or from the locality by scarification.

Given the same case, state treatment at an advanced stage.

Remove dead tissue well into the line of living tissue, preferably with a bone-bur in the engine, and leave to nature (Note 7).

State abortive treatment?

Starvation and excessive exertion, to favor resolution of the inflammatory process.

Is there any prophylactic treatment?

Sedatives, vigorous gymnastics, and non-stimulating feeding.

What differences in treatment of alveolar abscess on *side* or *end* of root?

None in principle.

Describe treatment of an externally pointing alveolar abscess?

Freely open to seat and remove with the bur as before advised. In doing this the soft tissues, including the periosteum, should be peeled up with the gum; then insert a spatula of wood, bone, horn, or celluloid, or silver, to hold back the soft parts to prevent them from being marred by the bur in removing the dead tissue.

Upon what medicaments do you mostly rely in treatment of acute alveolar abscess, and why?

Nauseants, cathartics, depletion, and any other antiphlogistics.

State practical values of the following, in treatment of acute alveolar abscess, and give general reasons for your selection?

Oil of Eucalyptus.	Not adapted.	Creasote.	Negative.
" Turpentine.	" "	Carbolic acid.	"
" Thyme.	" useful.	Potassium permanganate.	" or escharotic.
" Cloves, peppermint, etc.	Negative.	Gold chloride.	Injurious.
Zinc chloride.	See below.		

Zinc chloride, twenty grains to the ounce of water, with which to bathe the parts after the operation of removing the dead tissue, promotes union by first intention. The lips of the wound should be carefully coaptated without stretching, and held in position by a light compress, or, if needful, a stitch. All of the rest I reject in the treatment of acute alveolar abscess, as either negative, too stimulating, or escharotic (Note 8).

Given an ordinary case of *chronic* alveolar abscess, give treatment of same?

Find seat and extirpate dead tissue and effete substance and leave without forcibly washing out the blood, placing a compress when necessary.

What differences in treatment of chronic alveolar abscess and chronic pericementitis, and why?

Scarify the pericementum well into the cementum to disgorge the territory and leave to nature in pericementitis.

In chronic alveolar abscess extirpate dead tissue and leave as before directed.

Any differences in treatment of abscesses in lower and upper jaws?

None in principle.

Any differences in prognosis of abscess in lower and upper jaws?

More favorable in upper jaw.

When should extraction for alveolar abscess be practiced, and why?

When the pericementum is entirely dead, or so debilitated as to render a return to health doubtful. Never, if from dead pulp without pericemental destruction (Note 9; see also Tomes, in Note 7).

It will not have escaped your notice that I have very nearly ignored the pet remedies for acute alveolar abscess given in the list. Only one—zinc chloride, in weak solution—is accepted and commended in the treatment of acute alveolar abscess.

In *chronic* abscess resulting from necrosis, disinfectants, antizymotics, antiseptics, and even escharotics might be found useful if the old expectante methods of surgery were deemed advisable. But as I am strenuous in insisting upon thorough removal of the immediate source of the abscesses, acute or chronic (which is always foreign or dead matter), there is no call for these in cases where we seek union by first intention with the same reasons that we would if we were removing a foreign body recently introduced into the flesh, or if we were operating for a tumor or malformation.

I am asked to give the reasons for my preference of the remedy I commend. It is based upon the capability the zinc has of coagulating the protoplasmic fluid escaping from the wounded tissues to that degree which best favors the generation of embryonal corpuscles from which the new tissues are produced.

I stated in my first general remarks that nutrition consisted of tissue-feeding. I now state that the molecular metamorphosis of nutrient activity consists in oxygenation and deoxygenation, oxidation and deoxidation of the carbo-proteinaceous mass of pabulum out of which the tissues are built.

Oxygenation is an admixture of oxygen with the pabulum, in loose combination with the same, and is a low grade of burning. *Oxidation* is a complete blending of oxygen and protoplasm, and is true burning or combustion. By it water and carbon dioxide are generated, which hold in solution the metallic salts and nitrogen which are the ashes resultant from the combustion; thus presenting us with the effete products of nutrient activity in the form of lye (urine).

Nutrient activity is limited in the human body to a very small thermal range, viz., ten degrees—from 95° to 105° Fahrenheit. The incubation of the egg of the fowl is the most convenient example in which this metamorphosis may be witnessed, and corresponds exactly to the thermal range already stated.

The albuminous mass is not sufficiently dense in coagulation before 95° to constitute the elements of tissue, and the coagulation is too dense above 105° for the albuminous mass to be metamorphosed into the elements of the tissue. Experiment has shown that albumen subjected to heat ranging between 130° and 164° Fahrenheit is best adapted to be easily digested and converted into pabulum, and that it is very difficult of digestion if it is cooked at a degree of heat above 200° Fahrenheit.

It was a comparison of the degrees of coagulation of albumen produced by the 20-grain solution of zinc before referred to, and of albumen coagulated by 134° Fahrenheit of heat, that suggested that fibrilation of lymph under heat at this degree and fibrilation under the solution of zinc presented us with the correct bond of union between broken tissues as well as the proper food for the renovation of worn-out tissues, and for the construction of new. By such analogies as these, and observations based thereon, I have been led to prefer zinc as described in all plastic operations.

The principal excuse for presenting so crude a paper as this to this body may be found in the backwardness of its members in doing better work; and in the desire of your president and secretary to have me reply to the questions incorporated herein. These questions were sent to me so short a time before the meeting as to deprive me of time or opportunity for special preparation; thus compelling me to write in the incomplete and fragmentary manner reluctantly given you this evening.

NOTES.

(This paper is the result of questions addressed to Dr. Atkinson by me, said questions having been suggested by a cursory glance at some of the dental text-books most in vogue. I can corroborate to the fullest extent the statements in the Doctor's closing paragraph; although to my mind the paper needs no apology. —EDITOR PROCEEDINGS.)

NOTE 1.—"Alveolar abscess is a result or consequence of periostitis." (Taft's *Operative Dentistry*, 2d ed., p. 297.) "The immediate cause of alveolar abscess is inflammation of the alveolo-dental periosteum, and this may arise from inflammation and suppuration of the lining membrane and pulp; or from accumulation of purulent matter at extremity of the root." (Harris's *Principles and Practice of Dentistry*, 10th ed., p. 235.)

NOTE 2.—"Acute inflammation of the dental periosteum, when confined to the alveoli of one or two teeth, usually arises in connection with, and as a distinct sequence of pre-existing disease in the involved tooth or teeth. Examples are, however, not wanting to show that this disease may be established in the sockets of teeth perfectly free from caries," etc. (Tomes's *Dental Surgery*, 2d ed., p. 481.) "Several specimens in my own collection show that acute inflammation of the dental periosteum may arise in connection with a tooth without our being able to trace the cause. * * * * In nineteen cases out of twenty, however, the disease follows, or results from, or is an extension of, inflammation of the dental pulp, or is consequent on necrosis of the whole or a part of the fang of a defective tooth." (*Ibid.*, p. 489.) "The most common origin" (of inflammation of the root-membrane) "is a pre-existing inflammation of the pulp." (Wedl's *Pathology of the Teeth*, p. 213.)

NOTE 3.—"The cases in which alveolar abscess is most likely to occur are those of a manifest inflammatory diathesis, or those in which there is considerable local inflammation, from some local exciting cause." (Taft, *loc. cit.*, p. 298.) "Persons of a scrofulous diathesis are very liable to this affection, which, in these cases,

very soon assumes a chronic form." (Harris, *loc. cit.*, p. 234.) "General inflammation of the alveolar membrane, affecting the socket of each tooth, or at all events, the majority of the teeth equally, and dependent for its origin upon a constitutional condition, such as rheumatism, the presence of mercury or some other agent in the system, etc., etc. Local inflammation involving the sockets of one or two teeth, and dependent upon a local cause." (Tomes, *loc. cit.*, p. 476.)

NOTE 4.—Harris and Taft note the fact of different locations of alveolar abscess, but assign no reason therefor. Tomes does not mention different locations of the sac.—EDITOR PROCEEDINGS.

NOTE 5.—Harris, Taft, and Tomes all separate alveolar abscess into two kinds—or rather, perhaps, consider the general lesion under two heads—acute and chronic.—EDITOR PROCEEDINGS.

NOTE 6.—"In the cases of constitutional predisposition, the abscess after a time assumes a chronic character." (Taft, *loc. cit.*, p. 298.) Harris assigns to the scrofulous diathesis this prominent cause for change from the acute to the chronic form (*loc. cit.*, p. 234. See also *Note* 3). Tomes is not clear on the point.—EDITOR PROCEEDINGS.

NOTE 7.—Harris (*loc. cit.*, p. 236–37) gives the "therapeutic or surgical treatment." The first comprehends opening to the abscess, either through the gum and process, or the tooth, and "the application of such remedial agents as will cause the absorption or destruction of the sac containing the pus, such as creasote, carbolic acid, nitrate of silver, iodine, etc." The surgical treatment consists in opening to the seat of the lesion through the process; after which, "the attachment of the sac to the root is then broken up by means of a delicate instrument," and the external wound kept open for awhile to allow the escape of detritus. Taft (*loc. cit.*, pp. 300, 301) advocates the same treatment. Tomes (*loc. cit.*, pp. 489 et seq.) advocates depletion in the early stages, with anodyne and alterative applications to the gum; and adds: "If the inflammatory action has gone on for a day or two, it is probable that suppuration cannot be avoided, especially if the affection has spread to the gum. *In that case the tooth should be removed*," etc. (The italics are the editor's.) He admits, however, that there are cases in which "a doubt may sometimes arise in the dentist's mind whether, under certain circumstances, the removal of a tooth is desirable." If this doubt be reduced to a certainty, then "we must do what we can to relieve the pain and to reduce the disease to a state of passive gum-boil."(!) (In other words, convert the *acute* into the *chronic* form.—EDITOR PROCEEDINGS.

NOTE 8.—Taft (*loc. cit.*, p. 300 et seq.; see also Note 7) recommends the use of zinc chloride, silver nitrate, and creasote: the first (and sometimes the second) in the *solid* form, and the second and third liquid. Harris (*loc. cit.*, p. 236 et seq.; see also Note 7) names "creasote, carbolic acid, nitrate of silver, iodine, etc.," or a combination of some of these with tannin, glycerin, etc. Tomes (*loc. cit.*, p. 489 et seq.; also Note 7) advocates depletion in the early stages, and aconite, iodine, carbolic acid, and the aconite-iodine mixture as outward applications (on the gum), and the use of "strong carbolic acid" in the "track of the incision" made when the abscess is opened through the process.—EDITOR PROCEEDINGS.

NOTE 9.—"In the great majority of cases, where one-half or more of the periosteum of a root is involved in abscess, the indications certainly point to the removal of the tooth." (Taft, *loc. cit.*, p. 304).

A NEW DENTAL AMALGAM.*

BY A. H. BEST, M.D., L.D.S.R.C.S., SAVANNAH, GA.

THE subject of dental amalgam is worn so nearly threadbare, that considerable moral courage is absolutely requisite for those who now venture to approach it. Nevertheless, though very much has been said, and, perhaps, even more written on this fertile subject, it is not to be hastily assumed that the dental mind should abandon it as exhausted. An interchange of ideas and experiences stimulates thought and leads to fresh investigations and experiments. These in their turn yield results not in all cases wholly satisfactory, but always contributory to our stock of knowledge, and tending to still further elevate the scientific character of dentistry.

Amalgam, in the usual form, is now employed daily by thousands of operators. It undoubtedly saves many teeth that would otherwise be irretrievably lost; and although its use is as yet attended with results more or less uncertain, the advantages it secures justify the favor with which it is regarded. Though not so pretty as gold, it can be used in teeth too frail for that filling; and though, in disadvantageous contrast to the oxyphosphates, it fails to preserve the color, yet it endures attrition so much better that its preference is, in a measure, obligatory.

If, then, notwithstanding the objectionable features of amalgam, such as discoloration, contraction or shrinking from the walls of the cavity, and in many preparations unnecessary expansion, it is still found desirable to use it, it seems also necessary to make some effort to rid it of these inconvenient properties, for just in proportion as we succeed in this attempt, will we progress toward perfection in filling-material. The union of the desired qualities is most difficult to be attained, and will only be brought about as a reward of unceasing investigation and experiment, and of untiring study of metallurgy in all its bearings on this special form of alloys. It has, indeed, been found so very difficult to accomplish this result in alloys made by the usual processes that, notwithstanding the number of experiments that have been made with varying compositions, and under the most varied circumstances, the results are still far from satisfactory, and we may reasonably doubt the possibility of solving this important problem by the methods and upon the principles hitherto usually employed.

Nearly all dental amalgam-alloys are composed principally of silver and tin, to which in many cases just enough of the more

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* It was the intention of the author to read this paper at the Southern Dental Convention in Atlanta, but ill-health prevented.

precious metals has been added to render the process of alloying more difficult and more destructive to the tin, and to justify the vendors in giving their compound a name which it is hoped will help its sale. In this connection I may mention a simple fact in my experience, which probably has its parallel in that of many other operators. For many years I used nothing but the most costly alloys, yet to my great regret the results obtained from them were anything but satisfactory, and in many cases decidedly inferior to those attending the use of cheaper grades of alloys, for which no claim of containing gold or platinum was urged as a recommendation. It would, in fact, seem that the degrees of heat necessary for the complete fusion of these metals differ so greatly—the fusing-point of platinum being so very high and that of tin so low—that alloys containing platinum or gold are really and practically so much injured thereby that in many cases the propriety of such additions is questionable. Even in using but two metals, silver and tin, whose various combinations are supposed to represent the cheaper grades of amalgam-alloys, the greatest possible care has not completely overcome that obstacle which so greatly affects the qualities of such alloys, viz., the "burning of the tin" (as it is familiarly styled) by contact with the molten silver. Neither is this a matter of surprise when the melting-points of the two metals, and their behavior under such conditions, is taken into consideration. Pure silver melts at 1873° Fahr., and possesses the remarkable quality of absorbing many times its volume of oxygen when strongly heated or melted in common air. Tin melts at 442° Fahr., and when heated above this point, oxidizes very rapidly.

Under these circumstances it would, *a priori*, appear impossible to melt together silver and tin without producing the well-known results so detrimental to the alloy, since on the one hand, during the melting the silver is rapidly absorbing oxygen, which it holds in a state of solution, as it were, and not chemically combined with itself but to be surrendered as soon as the temperature falls; and, on the other hand, the tin is necessarily heated far above its melting-point, and is consequently in a condition favorable to the most rapid oxidation, whether it obtain the necessary oxygen from its solution in the molten silver, or from the surrounding atmosphere.

The addition of gold, platinum, and some other metals, to silver, removes this objectionable quality of absorption of oxygen while melted, but renders a great increase of heat necessary for perfect fusion; while increased temperature still more certainly oxidizes the tin, through its unavoidable contact with common air, and thus to a great extent, destroys the practical utility of such alloys. Actual experience has further demonstrated that, whatever might be the

advantages gained by the addition of small quantities of either or both of these less fusible metals to a perfectly combined alloy, they are not to be attained in a purely mechanical mixture of melted metal, which requires, to prevent a separation of the constituents, while still fluid, through the agency of gravitation or affinity, an almost impossible diligence of manipulation. In fact, so numerous are the difficulties that are encountered on the very threshold of the process, that we may well question the possibility of reaching a practical solution of the problem, at least so long as the metals are to be combined by fusion.

After much consideration of the question, at once so difficult, so important, and so interesting, it has occurred to me that alloys for dental fillings, which, when in use, are necessarily under water, should if possible be formed under similar conditions. The conditions under which such alloys are usually made are so diametrically opposed to those under which they are expected to endure wear, that the above conclusion seems justifiable; for how can we expect two seemingly inert substances to retain at ordinary temperatures that kind of mutual affinity which they only display under the exceptional influence of a heat amounting to thousands of degrees? All the metals usually employed in the manufacture of dental amalgam-alloys are to be found naturally combined with each other and with other metals, in varying but always definite proportions. If these alloys or combinations are the result of electro-chemical actions, under humid conditions, in the laboratory of nature, we may reasonably hope that her processes can be imitated by the chemist, and even that they may present fewer practical difficulties than the stereotyped method hitherto solely adopted.

It has also occurred to me that an alloy for dental amalgam should be a combination of metals on other principles than those of mechanical or physical laws. There is something more to be attained than mere hardness; something else to be sought for besides brightness of color; other disqualifications to be obviated than irregular expansion and contraction. Strange as some would think it, there are qualities more sedulously to be preserved, and of more importance to the real excellence of the material, than a certain percentage of precious, infusible, injurious metals, authorizing the high-sounding names that in too many instances merely cover a deficiency of the very substances claimed to be used so liberally.

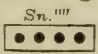
My position is that alloys for dental purposes should be definite in composition, as a departure from this principle disastrously affects their durability. By a "definite alloy" I intend a chemical combination of one metal with another, excluding all mere mechanical mixtures made by weight without reference to atomic affinity. Every

metal which is to enter into an alloy of this nature needs to be most thoroughly studied; its nature and behavior, both when isolated and in combination; its power of affinity for other metals, and the quantity necessary to form a saturated alloy, should all be perfectly familiar to the operator. How can satisfactory results be expected by investigators unacquainted with the laws of molecular affinity governing the formation of definite compounds through the polar attraction of atoms. I mean by "definite compound" a combination of elements, each of which loses the properties that characterized it in its isolation, to acquire new properties common to the whole, though perhaps totally dissimilar to those of the several constituents. It is, therefore, quite plain, that each metal entering into the formation of an alloy for dental purposes must have a special part assigned it in establishing and maintaining the chemical and electrical equilibrium of the mass. Each atom of metal should be completely saturated by the attraction of some other atom of the other metals entering into the composition, so that its affinities may be completely satisfied and set at rest. Alloys formed upon these principles have physical properties so distinct and in many cases so vastly different from those of their constituents, whether separately or in mechanical mixture, as to mislead the closest observer. On the other hand, mixtures of metals not governed by these laws do not form saturated or even definite compounds, and are therefore for the most part as readily separable into their original simplicity as in the well-known example of iron filings mixed with sulphur, out of which composition, as every one knows, the iron can be drawn with a magnet; yet let the mixture be subjected to a certain temperature at which chemical union takes place, for a certain time, and we have a distinctly different and saturated chemical compound as a result. The iron is no longer attracted by the magnet, nor is the sulphur soluble in sulphide of carbon, so that the simple mixture has become a definite combination again.

"When a clean piece of sodium" (I quote from Essig's "Dental Metallurgy"), "is rubbed in a mortar with dry mercury, the former dissolves and a peculiar seething sound, resembling that caused by the immersion of a hot body in water, is produced, due to the evolution of heat which accompanies the combination, the mercury rising rapidly in temperature as the pieces of sodium are added. As the mercury cools, the resulting alloy, which is brilliantly white, crystallizes in long, needle-like forms from the middle of the liquid, and the excess of mercury may be poured off." Now, in this place, the mercury is plainly in excess, and what takes place in consequence, *i. e.*, the complete separation by crystallization of the alloy from the uncombined metal, would also become apparent in other cases of indefi-

nite compounding, if the metal in excess were only liquid at ordinary temperatures, so as to be decantable like mercury. But we must not suppose that the solidification of the excess would have any influence upon the crystallization of the compound. I may quote the same author's example:

"The tendency on the part of the metals to unite in definite proportions may be studied in connection with platinum, iridium, gold, rhodium, ruthenium, and silver, when fused with tin. If the latter metal is in excess after cooling, a metallic ingot is obtained resembling closely the original substance; but by the action of strong hydrochloric acid the excess of tin may be dissolved, leaving crystals of a definite alloy of the tin and the noble metal, which cannot be further dissolved by the same acid, but which are soluble in nitrohydrochloric acid, even when the precious metal contained, whether rhodium, ruthenium, or iridium, is in the free state absolutely insoluble therein."

We have here an example of a definite alloy in which each constituent loses its individual characteristics and acquires new ones peculiar to the compound. Now, supposing the alloy in the experiment to consist of tin and silver, its formation would take place by molecular union, which in its turn would occur in accordance with the various laws regulating such combination, and particularly with the principles of atomic affinity. A molecule of silver is of the same size as an atom, or, in other words, the molecule is indivisible. Silver is, therefore, a molecule of mon-atomic affinity (univalent), uniting with a molecule of tin (quadrivalent) in the proportion of four to one. We accordingly, for illustration, represent a molecule of silver by a parallelogram with a single point in the centre, thus $\underset{Ag}{\boxed{\bullet}}$, and a molecule of tin by a similar parallelogram containing four points or centers of attraction, thus 

, replacing as a molecule four atoms of hydrogen, and hence termed a "tetratomic" or "quadrivalent" molecule. Therefore, in the case before us the definite compound of tin and silver will be represented by the following figure 

or one molecule of tin saturated by four of silver. On this principle must all definite compounds or alloys of these (and the other) metals be prepared, or, as is the case in the experiment under consideration, the excess of either constituent may be demonstrated to exist uncombined.

Now, all are familiar with the various metals commonly used in making amalgams and the proportions commonly employed; and I do not require to ask a question, which, as it were, carries its own answer, whether it would be possible to obtain a definite compound by uniting metals, in promiscuous proportions, and with disregard of such laws of union as we have seen to exist.

Silver, as we have already observed, is monatomic or univalent ($\boxed{\bullet}$). Tin and platinum are alike tetratomic or quadrivalent ($\boxed{\bullet\bullet\bullet\bullet}$). Gold is triatomic (trivalent) ($\boxed{\bullet\bullet\bullet}$), copper and mercury are alike of the class of biatomic (bivalent) metals and are represented by the sign ($\boxed{\bullet\bullet}$). When definite chemical inter-compounds are expected of these metals, these facts should be kept in mind, in order that by utilizing every point of union no atom is left free, unsaturated, and prone to be acted on by new agents as if isolated; that the very affinity should be at rest and the mass be in absolute harmony,—a harmony as complete as the most perfect chord of music.

The failure of so many compositions is evidently due to a want of this very harmony of compositon, the component parts not being in proportions that favor atomic equilibrium; and those molecules of metal not saturated to the extent of their affinity are free to unite with any other active unsaturated molecule, or to decompose any suitable compound that they meet, and in many cases by this union set agents free which immediately attack the tooth.

It was, then, due to a thorough appreciation of the principles involved and the objects which were to be attained, that I mapped out for myself a new line of thought in reference to the whole matter of dental amalgam-alloys. Figuratively speaking, I had waded through the pathless morass of speculative mixtures, finding not one to suit my purpose, so that I saw, if I must use the material, I had to try my own hand at making it, in the hope of producing something fit for use. It was evident that an alloy was what was required, and the chief question that presented itself was, "How shall I effect a combination of metals?" "Combination is favored," says an eminent French chemist,* "by heat, light, electricity, the nascent state, attractive force, bulk, and a certain active property." As we have seen that heat is injurious to alloys of the kind under consideration, and being familiar with some of the powers of electricity, I determined to attempt to produce my alloy by the process of electrolysis. Success was by no means the work of a day, even after the conception of this idea; for many difficulties were to be overcome before results of an encouraging nature were arrived at. Even then a long series of experiments was required. I am pleased to acknowledge in these experiments the kindly assistance accorded me by some of the most eminent chemists in this country and Europe, which was secured in order to arrive at anything at all satisfactory. Even after a promising result had been attained, practical considerations forced a sacrifice of some qualities obtained, in order to utilize others more es-

* M. Naquet.

sentially important, since by the isolation of these absolute permanence and durability seemed assured.

I shall not now enumerate the various experiments or modes of procedure by which we finally succeeded, but merely intimate that the principles governing electro-deposition of metals were employed by us, and success was due to a complication of apparatus for distribution of the current, which resulted in depositing from a chemical bath definite quantities of the metals held in solution, in such a manner that the strength of the solution was continually kept up by the same electric current.

And now to the practical results and the physical properties of the alloy produced, which is precipitated in the requisite quantity of mercury, adjusted in the bath by scales, which turn the beam and break the current when the definite deposition has taken place. We thus obtain a standard quality of alloy, which, by a proper process, is then reduced to an impalpable powder, in which state it is ready for consumption. This compound has now been practically in use and under observation for some years, and I have never seen a case of failure, or of discoloration of tooth-structure through its agency. When used without removing surplus mercury—a little of which is provided for greater ease and convenience of manipulation, and to have the mass of any required consistence—it is found to adhere to the walls of the cavity like cement. It is the only amalgam known that will adhere to a burnisher,—which it will do in its soft state,—permitting that instrument to be used to convey it to the cavity. When it is intended to be used on grinding surfaces, or where exposed to severe attrition, it may be made almost as hard as adamant by pressing out all superfluous mercury and packing with warm instruments. When it is to be used over exposed and capped nerves, where we may be necessitated to remove it before long, if permitted to retain the excess of mercury, it will set very soft, thus permitting its easy removal. It has many qualities of great value, but not the least recommendation, in my eyes, is that, so far, I have not seen a failure. I have not the slightest hesitation in saying that it is the only amalgam I know that will absolutely preserve, and not discolor, the tooth. In some mouths the filling turns quite black, but the tooth is never discolored.

In conclusion, I feel that it is proper to say that I have not undertaken the manufacture of this alloy for the trade. I find it requires the most expensive apparatus and much skillful handling to do this. On a small scale the production proceeds so slowly that, since our last meeting in Baltimore, one year ago, I have made scarcely twenty ounces; and yet I have done my best to have a few samples here for exhibition.

SOFT AND TENDER MOUTHS.

BY FRANK R. FABER, D.D.S., PHILADELPHIA, PA.

Read before the Odontographic Society of Pennsylvania, October 3, 1883.

The adaptation of a well-fitting and comfortable plate to an edentulous mouth that is soft and tender is not among the easy things in dentistry. There are but few of us who have not met with disappointment in the effort. I have read text-books and journals, attended dental meetings, and inquired privately of my brethren, with a view of learning how to meet such problems in practice, always with the same result—failure to obtain any information of practical value. Startling suggestions have been made about the use of the knife for the removal of superabundant tissue; wonderful mechanical principles have been expounded upon which to construct a plate that would balance itself; laws of cause and effect, and the principles governing displacement, have been explained to me in detail, but in application have proved valueless, or generally so. At last, having tried every suggestion except that of the knife, I became almost discouraged. This was about two or three years ago, and while I had twelve or fifteen patients of this class. They all made the same complaint—the upper plate would not stay in place, the slightest pressure dislodging it, while the lower plate was so uncomfortable that it could not be worn for any length of time, much less be used in mastication. Upon close questioning, the patients answered invariably that they had lost few if any teeth by extraction—nearly all by absorption of the alveolar processes. Is it not a reasonable conjecture that this fact explains the cause of the soft and tender condition of the tissues in such cases,—the gradual wasting away of the alveolar borders by disease resulting in a loose and flabby state of the gums? Is it not reasonable that, when the teeth have been forcibly extracted while yet their roots remained sound, the irritation which follows, and which is maintained by the sharp edges of the bony sockets, results in an absorptive activity which leaves a firmer and denser condition of the soft tissues than when the process of absorption is of the character before alluded to?

About two years ago a patient—a tall, large-boned, spare-fleshed man, of the soft-mouth class—presented, and of all the cases I have ever seen of this order this was the worst. The upper ridge, anterior to the position of the first bicuspid, was a spongy mass so soft that the thinnest plaster that I could use for taking an impression would displace it to such an extent that it was impossible to get an accurate model. He had had several sets of teeth made, but could use none of them. His first plate had had a deep suction-chamber, and each

succeeding plate a deeper one ! so that, in looking into the mouth, the first thing to be seen was a mass of tissue which had been drawn down into the chamber, and which was from a sixteenth to an eighth of an inch thick, and exceedingly tender. This by the way, is a common condition with soft-mouthed patients who have worn plates with vacuum-chambers. I secured two plaster impressions, the best I could obtain, and constructed a denture for him upon vulcanite. My success was not brilliant—in fact, I did no better than my predecessors. After he had tried to use the plate for some time, without success, I made another, with the same result. A friend advised a metal plate, and urged its superiority on account of conductibility, etc. I made him a metal plate : result the same—failure. My patient was determined to stay by me until he should secure a fixture that would supply his wants. All this time he had been living on soft food, which was becoming distasteful, and he felt that his strength was failing. The wearing of the metallic plate had not improved the condition of his mouth, although I have seen cases in which a metal plate had materially improved the soft mouth. I took another impression, made him a plate upon vulcanite, without an air-chamber and with spiral springs. The lower plate was made as small as would suffice to cover the ridge. After the usual amount of cutting and trimming of the lower plate, which in this class of cases is necessary to make them bearable, I dismissed him. After a few days' trial, he reported partial success. The upper plate staid reasonably well in place, aided by the springs ; but the lower one was so painful that its use was attempted only every other day. The use of mild astringents having been suggested, Pond's Extract was faithfully tried for six weeks and abandoned. Phénol Sodique as a mouth-wash was then tried, and after four weeks' use the patient reported a decided improvement—a sense of comfort never before experienced. He was dismissed with injunctions to continue the use of the Phénol. About two weeks thereafter, while absent on my vacation, he wrote me that he had lost the set of teeth mounted on springs out of a railway car-window, and had no other set that he could wear. On my return two days after, I was surprised and delighted, on examining his mouth, to find, instead of the pale, flabby mass of lusterless tissue with which I had become familiar, a good healthy color, a reasonably firm ridge, and the tissues of the mouth generally more compact and solid. An impression was again taken, the model of the upper jaw was trimmed around the outside of the alveolar ridge where the upper edge of the band would come; the surface was scraped at the palatine edge of the plate, and a thin disk placed on the model. Plain teeth were used, and the upper ones were pressed as far under the alveolar ridge as possible in order to prevent

rolling of the plate. The lower teeth were set directly upon the ridge, the crowns of the bicuspids and molars projecting a little beyond the upper ones, thus making the lower set the widest. This arrangement was especially applicable in this case as the patient was continually begging for more tongue-room. It also lessened the tendency of the upper plate to slide out of place, as it is apt to do when the teeth are placed beyond the ridge or the lower plate is not broad enough to balance it. The teeth were made shorter than regard for appearances would have indicated, in order to lessen the tilting leverage, and the lower plate was made only wide enough to cover the ridge. The patient reports that he is getting along very well, is able to eat his food with satisfaction and to masticate it thoroughly, with very little pain or inconvenience.

I do not know if this treatment will prove as satisfactory in every case, but I am convinced that in order to render a mouth of this class permanently comfortable some agent must be employed that will restore the tissues to a healthy condition, and I know of no remedy which promises better results than Phénol Sodique. Should another patient of this class present, my methods of procedure would be to make both upper and lower dentures on a vegetable base, without an air-chamber, using plain teeth, and placing them as far under the ridge as would be consistent with a proper occlusion; mounting the lower teeth immediately upon the ridge and coupling the plates with spiral springs. These plates I would direct to be worn during the effort to restore the tissues to a healthy condition. I am not sure that it would not be well to have the upper teeth bite inside of the lower ones. We meet occasionally with a case that cannot be successfully treated in any other way, but when the teeth are so arranged they give entire satisfaction.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION—TWENTY-THIRD ANNUAL SESSION.

Section I. Artificial Dentistry and Metallurgy, was opened for discussion.

Dr. S. C. G. Watkins, Montclair, N. J., reported the case of a lady for whom he had experienced great difficulty in fitting an artificial plate because the teeth would not stay in place during mastication. The patient was a lady fifty years of age who had been an invalid for seventeen years. The alveolar process was all gone and the mouth flat. He first inserted a set on rubber with long teeth; there was beautiful suction, but when the patient attempted to eat the

teeth would wabble all over the mouth. He then made another set in which the teeth were short; the suction this time was so strong that it could not be broken by taking hold of the front teeth, but the moment the patient attempts to eat it breaks and the teeth drop. He could not find anything wrong with the articulation, and would like to know what to do next.

Dr. C. S. Stockton, Newark, N. J., would so articulate the teeth that there would be a space of from $\frac{1}{16}$ to $\frac{1}{32}$ of an inch between the front teeth of the upper and lower sets when the mouth was closed.

Dr. C. H. Harroun, Toledo, thought there might be another difficulty, owing to yielding of the soft parts under the plate, and the plate not being fitted properly at the sides. If this is the case, he would trim out the plaster model so as to equalize the pressure.

Dr. Dickerman thought there might be still another difficulty. The leverage may not be on the line of the alveolar ridge.

Dr. Watkins replied that the first set was so far in as to leave little room for the tongue. The second was straight under the ridges.

Dr. J. E. Cravens, Indianapolis, would suggest that at fifty years of age the teeth are usually worn smooth; if that difficulty was fixed the set would probably work right.

Dr. W. N. Morrison, St. Louis, wanted to protest against cutting natural teeth so heroically as was frequently done in setting artificial crowns. It is a mistake to cut down to the margins and adjust the band so as to impinge on the gum. We should, in all cases where it can be done, so adjust the band as not to drive it below the gum. If the band goes below the gum that much tissue is destroyed, and nature's grasp on the tooth is so far lost, and the fixture is, besides, less cleanly. One method that has been offered insists on tenoning the root accurately for the reception of the band. This is a very unnatural method. He preferred to secure stability, if necessary, by going into the natural canal two-thirds of its depth, and adjusting a pivot of platinum, platinum and iridium, or platinum and gold. He dressed the root down to the gum on the labial surface,—under the gum on the other surfaces only. The pivot is made to fit loosely but accurately. A little gold collar is made to fit the stump of the root, and a cross-pin tooth is used, backed up and filled in with pretty hard gold. The attachment is made with oxyphosphate of zinc. Great care should be taken to keep the parts dry, as of course every one knows.

Dr. C. S. Stockton had noticed that in a large majority of the ferrule crowns which had come under his observation the gums receded. He had been compelled to take off several from this cause and insert others.

Dr. E. Parmly Brown, Flushing, L. I., had been experimenting for twenty years in mounting artificial crowns, and had arrived at a system in which he could see no defects. He could conceive of no root fit to remain in the mouth, upon which a crown might not be mounted by this system. From a single piece of platinum he cuts a plate or disk somewhat larger than the neck of the root to be crowned. The edges of this plate are swaged over like the lid of a blacking-box, and it is then fitted. The plate is then cut at fifteen points, so as to form as many pins pointing in different directions, which are baked into the tooth. The crowns are set with amalgam, which he believed to be the only material fit for the purpose. For back teeth he prefers a metallic crown filled with amalgam.

Dr. Buckingham. The subject of artificial crowns has attracted more attention during the last two years than anything else in dentistry, and every effort to arrive at some process by which to preserve the natural roots should be welcomed and encouraged, because by this means we are enabled to give to patients useful masticating organs from what would otherwise be condemned to the forceps. Where the roots are decayed down, a platinum tube split at the lower end may be used, the split end being spread to tighten the hold of the tube by filling with amalgam. The strongest teeth for crown-work are ordinary plain plate-teeth. You can cover the whole back with gold plate and make it very strong, and the backing may be made to lap around the edges, so as to represent a filling on both sides of the tooth. By this means all the strain comes against the backing instead of the tooth. Fit a thin piece of platinum wire in the pulp-canal and a piece of plate to the end of the root, then solder pin and plate together; fit the tooth and take out and solder to the platinum plate, and you will have a tooth that will fit perfectly. To set the crown permanently, put in some phosphate of zinc—it is not correct to say oxyphosphate—and adjust pin and tooth to their proper position. It is sometimes difficult to get a tooth of the proper color. In such case select one as near as you can get it, paint it over with mineral paint, put into a crucible, heat to a point that would melt silver, when the paint will be burned in. This can be done with an ordinary blow-pipe and charcoal. It is, however, better done with a crucible, and better still in a furnace.

Dr. A. E. Matteson. How much allowance does Dr. Buckingham make for the changes in color that will occur in the furnace?

Dr. Buckingham. That you have to get by experience. Some shades change very little.

Dr. W. Storer How explained his system of mounting artificial crowns. [This method, having been described fully in the Dental Cosmos, 1883, pp. 179, 240, 356, is omitted here.] In reply to a

question Dr. How said that as a rule he used amalgam for attaching the crown to the root, but gold might be used.

Dr. W. C. Barrett, Buffalo, wished to present an idea in the setting of gold crowns, which was original, so far as he knew, with Dr. H. A. Baker, of Boston. Copper is rolled down quite thin, and a band three-fourths of an inch wide is wrapped about the root of the tooth and forced under the gum. A ligature is passed around both, the copper band is burnished down, and the ligature drawn tight. This copper band will now fit just about as we want the gold band to do. Plaster of Paris is then inserted in this, forced up against the end of the root, and permitted to set. Take it off, and if you use babbitt metal, a piece of paper wrapped about it will lengthen it out sufficiently, when the melted metal may be poured into it, and thus a perfect model of the end of the root be secured. That part that is inserted in the copper is the exact reproduction of the root of the tooth. The model will perhaps need a little dressing down with a file, when the gold band may be fitted about it and soldered, thus avoiding the necessity for the annoying and painful trying-on in the mouth.

The subject was passed.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

The following paper on "Treatment of Children's Teeth," was then read by Prof. E. T. Darby:

Mr. President and Gentlemen:—It was with great reluctance that I consented to appear before you this evening. The idea of my presuming to instruct such a body of gentlemen as I see before me is absurd, to say the least. Will you not therefore accept as my apology for the apparent audacity, my desire to gratify your worthy president, as well as the importance of the subject chosen?

That the teeth of children are not receiving that degree of attention which they demand is a fact I feel sure none will attempt to deny. I am confident I speak with moderation when I say one-half of the children of the present day are receiving little, if any, dental treatment prior to their tenth year. There seems to be a belief quite prevalent that the temporary teeth are of little importance, and that since their period of duration is a brief one they are unworthy of the attention which is bestowed upon the permanent set. That the dental profession is largely to blame for this wide-spread belief I am free to assert. Each profession is in a measure responsible for the ignorance which exists in the public mind with reference to itself. No stream is higher than its fountain-head,

neither is a community wiser in the arts and sciences than it is made by those who are the recognized exponents of them. Believing the subject worthy of our attention, I ask your indulgence for a few moments only.

And first the argument.

The temporary teeth are of vital importance to the well-being of the child, and ought therefore to be preserved. They are important physiologically. Their eruption is coincident with the child's need of them. The period of milk-diet has passed, and food of a solid nature enters more or less largely into the daily needs of the growing child. The act of mastication is one of great importance in the digestive function, and yet how few children are able to properly masticate their food. Take the average child between the third and seventh year and note with what difficulty it masticates solid food. It is constantly embarrassed in its efforts to do so because of the sensitiveness incident to decay in the molars. The food is carried from one side of the mouth to the other, and generally swallowed before it is half masticated. I doubt not one-half of the gastric troubles so common in children could be traced to imperfect mastication of the food taken into the stomach. The cause of this is due largely to imperfect teeth.

Again, the preservation of the temporary teeth is important from a humane stand-point. Consider for a moment the pain and suffering which children are daily and hourly experiencing as the result of carious teeth. The cry of pain comes alike from palace and hovel, and, I regret to say, too often meets with little or no sympathy on the part of those who are responsible for its cause. I believe it wholly unnecessary that any person living in this enlightened day should suffer an hour's pain from toothache. Our children should go from cradle to grave, though forty years intervene, without an exposed or aching pulp.

Again, the preservation of the temporary teeth is important from an esthetic stand-point. What is more beautiful than twenty white teeth in the mouth of a child, and what more unsightly than a mouthful of diseased or discolored ones? I am aware that all teeth are not developed alike beautiful, but there is less deformity in the temporary than in the permanent set. A little care on the part of the parent and dentist in the early life of the child will insure white and beautiful teeth, and its appearance be rendered attractive rather than repulsive. Children are not taught early enough in life the habit of cleansing their teeth. If children can be taught to read at the third or fourth year, they certainly can be taught to use the tooth-brush. Children are by very nature imitative. We all know how easily habits are formed in early life. An act is sown, a habit

is reaped ; a habit is sown, a character is reaped ; a character is sown, a destiny is reaped.

Having considered briefly the importance of saving the teeth of children, let us next consider some of the difficulties.

I have already alluded to one of the chief difficulties which beset us, namely, ignorance on the part of the public. Parents tell us they did not know their children's teeth needed attention. It is their business to know it. There is an ignorance that is criminal. I hold that it is criminal for a mother not to know that scarlet fever and smallpox are contagious. It is criminal not to know that arsenic and corrosive sublimate and Paris green are poisonous. Ignorance and stupidity have been the cause of as much suffering and misery as intentional sin. Other parents will tell you they did know their children's teeth needed attention, and they had intended having them cared for. Good intentions alone will not save teeth. There is a place, we are told, of which Diabolus is king, and where he holds glittering court, the streets of which are paved with good intentions. Every practitioner of dentistry should be a teacher as well, and his whole duty has not been performed until each mother whom he can influence is made to realize the importance of early attention to her child's teeth.

Another great difficulty which we encounter in our dealings with children is the deception which has been practiced upon them at home. I sometimes think the nursery is a training-school for deception and falsehood. It is astonishing to what an extent deception is practiced upon children. For instance, they are told that the apothecary's physic is as sweet as sugar, that the surgeon's knife is as the scratch of a pin, and that the dentist's forceps are as painless as the barber's shears. Children are innately trustful and confiding, but when they have once been deceived it is difficult to gain their confidence. Parents will go home from a sitting at the dentists and, in the presence of their children, complain of the instruments of "torture" and the pain they have experienced, producing in the mind of the child an intense fear of the dentist; and yet, the following day drag the same child to the same dentist for the performance of a similar operation, and assert, with an air of the greatest truthfulness, that it will not hurt them in the least. Truth is always better than falsehood. The confidence of a child is often worth more than that of an adult.

Children will bear a great deal of pain, and bear it patiently, if they are not deceived at the outset; but woe to him who, having first deceived his little patient, tries to re-establish its faith in him.

Permit me to relate a case which illustrates the truth of this. Some twelve or fourteen years ago a mother called with her daughter,

a child of twelve years, to ask me if I would undertake the care of her teeth. She had already been to other dentists, but they failed to accomplish anything for her because of her intense fear and the nervous dread which the dentist produced upon her. I learned from the mother that years before, when it became necessary to remove a deciduous tooth, she had been taken to a dentist, and, without telling the child what he was about to do, he concealed his forceps in his sleeve and without her consent removed the tooth. She had been assured by him that she would not be hurt. To convince that child that all dentists are not liars was as difficult as it was tedious. All that was accomplished at the first and second sittings was the removal of a little stain from the teeth with a piece of wood and pumice. At the fifth or sixth sitting a temporary filling was allowed, and at subsequent sittings all of the teeth that needed filling were attended to. I had gained her confidence, and for at least twelve or fourteen years she has been a regular patient, and one of the most appreciative in my practice.

I know of nothing more diabolical than deceiving an innocent, trustful child, and he who will intentionally do it is an ignoble fellow. Another great difficulty is to be found in the dentist himself. He is not fond of children and dislikes to work for them; he is impatient and generally disagreeable. Children are quick to perceive this tendency, and at the hands of such a one will bear less pain than from another who impresses them differently. Such dentists do as little as possible for children, and pronounce them finished ere they have hardly begun. Again, children are often discouraged by too long sittings or too protracted operations. Half-hour sittings are long enough, and fifteen minutes often better. A great victory has been gained, if the child be sent away the first time with pleasant impressions. I remember to have once heard a dentist say he kept in his office a lot of china dolls which he gave to little girls at the close of the sitting for good behavior, also some cheap knives and rubber balls which he gave to the boys. The principle is a good one, and if the dentist can thus ingratiate himself into the affections of the child, it is a good investment.

Having considered the importance of saving the teeth of children, likewise the difficulties, let us now attend to the methods.

I have already alluded to the importance of seeing the child early in life. If we would be of greatest benefit to children we must see them early in life and at frequent intervals. If the teeth are carious they should be filled while the cavities are yet small. A great mistake is often made by both parent and dentist by postponing such operations. Small cavities may be filled with little or no pain, and not infrequently superficial caries can be removed and the disease

arrested. When the incisors are found slightly decayed, my practice has been to file them largely asunder, and afterwards polish the approximal surfaces with emery strips and oxide of tin. The same practice may be used to advantage on the approximal surfaces of the molars. If caries has penetrated the dentine and is too extensive to warrant removal, fill with gutta-percha, or, what I consider superior, some of the better preparations of phosphate of zinc. And just here let me say, to get the best results with this material, it should be mixed very thick. I am in the habit of mixing it as thick as putty, and then rolling it between my thumb and finger, working the oxide of zinc into the mass until it will hold no more, and while in this condition pack it into the cavity as stiff as possible. But a few minutes is required for hardening, and the process may be hastened by throwing upon it a blast of hot air from the hot-air syringe.

It frequently happens that the pulps are found exposed in the temporary molars. When such is the case I devitalize them at once, not by the use of arsenic, but with carbolic acid and cantharides. My method is to moisten a small pellet of cotton with carbolic acid and then apply to its under surface a little powdered cantharides. One or two applications are usually sufficient to devitalize the pulp in a temporary tooth. When the pulp is found to be painless it is removed from the pulp-chamber, and as thoroughly as convenient from the canals; a disk of thin platinum is then fitted over the opening leading from the cavity of decay into the pulp-chamber. To hold this disk in position a little gutta-percha or gum-damar is placed upon its under surface; the whole is then warmed in a spirit lamp and tacked in position in the cavity. The cavity of decay is then filled with amalgam or phosphate of zinc, as may be thought preferable. After this has been done a small tap-hole is made with a small drill upon the buccal surface at the free margin of the gums, to allow the egress of any gases which may arise from the non-removal of any portion of the pulp. While I would condemn as heartily as any one present a similar treatment for permanent molars, I am convinced, after many years of such treatment, that it is the best known for temporary teeth. It prevents the probability of subsequent pain and the too frequent result of abscesses. You will all bear me witness that a devitalized pulp in a temporary tooth means a subsequent abscess if this precaution of drilling is not observed, and many nights of suffering are spared the little patient if this practice is followed.

There is another operation upon the temporary molars which is too frequently overlooked, but the importance of which cannot be overestimated. I allude to the free cutting of the distal surface of the second molar upon the appearance of the first permanent or sixth-

year molar. When this operation is neglected, the mesial surface of the permanent molar is usually the seat of caries. As soon as the sixth-year molar has taken its position in the arch alongside of the second temporary molar, I cut away largely with a disk from its distal face, thus preventing three or four years of contact, which at this period of life is so fatal in its results.

I had not intended speaking of the temporary teeth with reference to their influence upon the permanent ones. I have never been of the opinion that the premature loss of the temporary set has exerted a marked effect upon the position of the permanent ones in the matter of irregularity; but there is one mistake which dentists so frequently make that I believe it worthy of our consideration for a moment. I refer to the early removal of the temporary cuspids to make room for the permanent laterals. In my judgment a greater mistake cannot be made; and yet it is one which almost daily occurs. What is the result? The first permanent bicuspid, which precedes the permanent cuspids by several years, takes its position by the side of the permanent lateral, and no room is left for the cuspids. The choice then to make room for the coming tooth lies between the expansion or enlargement of the jaw, or the removal of the first bicuspid. To accomplish the first is usually an undertaking of no small moment; to resort to the other not infrequently gives, as the result, a deformity which is as apparent as it is unnecessary. Allow the cuspids to remain, and trust to the rapid enlargement of the arch between the eighth and twelfth year to make room for the laterals.

And now, a few remarks with reference to the treatment of the permanent teeth in early life. Perhaps a better rendering of my subject would have been, "The Treatment of Young Teeth," for I did not intend confining my remarks to the temporary set. It has long been my opinion that young or uncalcified teeth demand a different treatment from those which have become hard from age.

Let us begin with the incisors, which are often the seat of caries soon after their eruption. Wherever they are found to approximate each other closely it has been my habit to separate them often with wooden wedges, and polish the approximal surfaces with emery tape, and finally with linen tape and pumice or chalk. I have seen the benefit of such treatment in two of my own children, aged respectively fiifteen and twelve. When the four incisors had taken their position in the arch I inferred from their close contact that the approximal surfaces would certainly be the seat of caries if precautions were not taken to avoid it; therefore I began early the above treatment, and at intervals of a few months for several years have separated them and rubbed them freely with emery strips. The

result has been most satisfactory. In the case of one of them the centrals had become the seat of minute cavities. These were filled with phosphate of zinc, which was allowed to become very hard before moisture was admitted. These fillings have been in nearly, if not quite, two years, and not the slightest wasting has as yet taken place.

The practice of filling these young teeth so generally with gold is one which cannot be too strongly condemned. I believe the induction of thermal changes through gold fillings has been one of the most prolific causes of devitalization of the pulp. Were the plastic materials more generally used prior to the fifteenth year, better results would be obtained. Amalgam of the better grades for masticating surfaces, phosphate of zinc, gutta-percha, and tin foil for approximal surfaces, commend themselves to men of experience and close observation. In my own practice I rarely insert gold fillings in the anterior teeth before the child has attained the fifteenth year, and if the cavities are deep-seated, I take the precaution to interpose some non-conductor between the floor of the cavity and the gold.

The best operations of gold often fail in these young teeth, and how much wiser is it to fill such uncalcified teeth with some material easy of insertion, allowing the fillings to remain until the teeth have hardened and the patient attained an age when it will more patiently endure the fatigue incident to prolonged sittings.

Discussion.

Dr. Lord. I would like to ask Professor Darby whether he separates any of the temporary teeth while they are yet sound, to prevent decay.

Dr. Darby. I do not, unless there are indications of decay; a breaking-down of the enamel or something to indicate that decay is soon to follow. I do it wherever the teeth are very much crowded. I run a thin file between them and polish them with corundum tape. I do not consider the space objectionable in the temporary teeth; it would be somewhat unsightly, yet the unsightliness continues but a few years.

Dr. N. W. Kingsley. I have listened with much interest and satisfaction to Dr. Darby's paper, particularly as it bears so closely upon my remarks before the Odontological Society at its last meeting. After I returned home from that meeting I thought it would be well to put my views in a little better shape than I had probably done in an extemporaneous address, and I did so, following out exactly the line which I had given in my remarks there, and sent it to the prize essay committee of the State dental society. I was not suspected as the author of the paper, but they were kind enough to

award to it the prize. I feel an additional gratification on this occasion, because there are other gentlemen besides the one whose views I particularly opposed at the last meeting, who have held his views on that point in opposition to those I was advocating. It seems to me that it could hardly have gone unrecognized by any one that the early or premature extraction of the canine would almost inevitably lead to the closing up of the space, and bring the bicuspid and the lateral into close contact. All through life we see an inevitable tendency of the teeth back of the canines to push forward when there is space in front, unless the occluding teeth of the opposite jaw prevent that movement. Many times we have all seen the first molar in contact with the canine, where the bicuspids have been removed. There is very rarely any movement of the teeth backward. In removing the temporary molars and the canines before their time there is a tendency of the first permanent molar to move forward and close up the space, so that when the bicuspids come to develop they will move forward into the space belonging to the canine, and crowding and irregularity will follow. That is not a shrinkage of the jaw, in my estimation. That matter was discussed privately by some gentlemen at the close of the last meeting, and some believed, and would so maintain, that it was a shrinkage of the jaw. I think it was only a mistake in the use of terms, and that what was meant was not a shrinkage of the jaw, but a shrinkage of the alveolar process. But I do not believe that, in a strict sense, it is a shrinkage of the alveolar process. It is a movement of the teeth along the process on the line of the jaw, and not a movement of the process. I will add only that I am much gratified to have my views confirmed by so high an authority as we have listened to this evening.

Dr. Dwinelle. The remarks Dr. Kingsley made in reference to the movement of the teeth posterior to the cuspids invariably being forward I indorse thoroughly; there is no doubt about that. At the last meeting, I referred to a case where the two superior bicuspids and the sixth-year molar were extracted for the purpose of correcting irregularity of the teeth, and the forward movement, in due time, brought the twelfth-year molars in the superior jaw forward so that they impinged tightly upon the cuspids. To-day, I had a patient in my chair who has been in my charge for a good many years. I filled his first teeth, and I took a great deal of pride in filling them. He was only eight years old when I filled his sixth-year molars, and his teeth were then very soft. I filled the sixth-year molars with gold, and afterwards removed the gold and filled them with tin. I let that remain a few years, and then, when the teeth had become consolidated in their formation, I filled them again

with gold. Although filled very extensively with gold, I am satisfied with them. The twelfth-year molars decayed in time and were filled. They have all maintained their integrity with reference to regularity until lately. When I looked at his teeth to-day I was indeed puzzled. When I saw them before, less than a year ago, both the upper and lower teeth were remarkable for their regularity; his upper and lower front teeth especially were beautiful in their symmetry. To-day they are becoming irregular, are twisted and turned around sidewise; the arch of the lower jaw especially, from being formed with great regularity, is becoming twisted and diverted, and will continue to become so, because the wisdom-teeth are coming in laterally, quite out of line, and are pushing down upon the twelfth-year teeth, driving them forward in the mouth, and making a cranky circle. It is all from the influence of the wisdom-teeth that his teeth are becoming irregular. Fortunately, the wisdom-teeth are not very good. I am very glad of it, because I shall sacrifice them, and I hope thereby to be able, in this instance, to get a backward movement of the molars and correct the deformity.

Dr. Kingsley. I would like to ask Dr. Dwinelle how he *knows* the wisdom-teeth are exercising the power he attributes to them. I admit that there was a power from behind that was crowding the teeth forward, and it may be coincident with the arrival of the wisdom-teeth, but I must say I am not convinced that all that power lies in the wisdom-teeth. We must attribute to the wisdom-teeth some tremendous dynamic influence, to produce such results.

Dr. Dwinelle. I do not think Dr. Kingsley would doubt it if he should see the case. We know that there is an inherent tendency in the wisdom-teeth to move, and the direction of that tendency is forward. That it is so in this case the mouth furnishes evidence, because the wisdom-teeth, being out of their position, are lateral in their tendency as the line is formed, and are pressing the twelfth-year teeth down inside of the others, so that the space across from one twelfth-year molar to the other is manifestly less than it was normally. The wisdom-teeth have pressed them out of line. There is certainly a crowding tendency. I asked the gentleman to-day why he did not use floss silk more, and he said, "I cannot use floss as I could once; I cannot get it through between the teeth." We know that the eruptive power of the teeth is naturally very great. We know the wisdom-teeth are generally erupted with a great deal of trouble and pressure, especially if they are large, and that it is their nature to move forward in the jaw. When they are erupted, there must be space made for them, and that space is gathered in this forward movement. If the wisdom-teeth are small, the tendency to irregularity is less than it is if they are large. If

the twelfth-year molars are removed early, they are almost invariably large, but usually if the arch is full they are not large.

Dr. Kingsley. The point I wish to make is simply this: that the teeth will move forward after you have taken the wisdom-teeth out. I have seen that same jamming and pressing to the forward part of the mouth in children of thirteen or fourteen years of age. I have one case in my mind now, a child of fourteen years of age, where there was the same jamming process, and no appearance of the wisdom-teeth; and I have, in other cases, seen the same jamming process when the wisdom-teeth did not appear for ten years after. Again, you will bear in mind the fact that sometimes the wisdom-teeth come head on, as you might say, with the grinding surface pointed towards the twelfth-year molars, and in their growth we might expect a pushing of the molars toward the front of the mouth. Such a position of the third molars is, however, abnormal; their natural normal position is with the grinding surfaces turned a little backward rather than forward. The tendency to move towards the front is nevertheless the same. That is the reason I say that I do not know it is the wisdom-teeth that cause this forward movement; but it is coincident with their development.

Dr. Dwinelle. It is coincident. After the eruption of the wisdom-teeth we find this irregularity in a set of teeth that have hitherto been regular, and we always attribute it to the wisdom-teeth. It seems to be coincident; but a number of coincident cases establish precedent, and precedent makes law.

Dr. Howe. Dr. Dwinelle has not told us how old the patient was that he spoke of, and I would like to have him state that. He said he intended to take out the wisdom-teeth, and was very glad they were poor. I would like to ask him, after he has told us how old the patient is, what he would do if the wisdom-teeth were good.

Dr. Dwinelle. The patient is between eighteen and nineteen years of age. The next question is, what I would do if the wisdom-teeth were good. I think I should take them out.

Dr. O. E. Hill. I consider myself fortunate in having heard the paper which has been read, and I admire the author's conservative manner, with his positive statements. I am more than delighted to hear the opinion expressed by so high an authority that the anterior teeth should not be filled with gold previous to fourteen or fifteen years of age. I hope the members of the Odontological Society will give this subject their serious consideration. Dentists are slowly awaking to a knowledge of the fact that, as a rule, it is bad practice to fill the front teeth with gold when the patient is under fifteen years old. To-day a patient come into my office for whom I, under protest, had filled a lateral incisor with gold about a year ago. The

parents had then said they must have a gold filling, and I put it in, believing it to be wrong practice. The pulp was not exposed then, but it is dead to-day. Last summer I filled four lower incisors with phosphate of zinc, the patient, a boy, then going into the country. A dentist in the locality where he went declared such stuff a humbug, removed the zinc fillings, and replaced them with gold; since which operation the pulps have all died. Very many young teeth have been sacrificed to gold fillings when the pulps were not quite exposed. A young lady was in my office recently, for whom I put in a gutta-percha filling in an incisor fourteen years ago. I have never touched it since, and it is to-day as good as when first inserted. I have a family as patients which I have closely watched. One of them, a boy, came to me sixteen years ago, and I filled his teeth with gold, in deference to the wishes of his parents. The cavities were large, the pulps were not exposed, yet all but one are dead. The teeth of his four sisters I filled, soon afterward, with gutta-percha, and their pulps are all alive. So case after case could be cited. I heartily indorse what Professor Darby has said on this subject.

Dr. Benj. Lord. The subject so ably and intelligently presented by Prof. Darby is one of peculiar interest to us, and should be to all both in and out of the profession.

The care and treatment of children's teeth, particularly of the very young, seem, however, to have been lost sight of both by dentists and by parents. As has been suggested, there is a great lack of information on the subject, or appreciation of its value, and this may be ascribed more to the fault of the profession than to that of parents and those having the care of young children. It would seem as though the dentist had not considered the temporary teeth worthy of the care and skill required to preserve them while they naturally would remain, while parents have not understood the need of it for the general health and comfort of their children. Even when anything was done, it has not been felt that time and skill were required as much as in their own cases. But we may rejoice that the subject is beginning to be better understood and to receive attention. That the first teeth may for the most part be preserved as long as they are required for the natural uses, as well as to prevent great and needless suffering, is very certain.

I was greatly interested in what was said of the value of tin for filling both the temporary and permanent teeth in early life. It is unquestionably much to be preferred to amalgam or any of the plastics, when it can be used to advantage. This is generally felt by the profession, but it seems to be not much used, partly, no doubt, because of the notion of patients that gold, owing to its intrinsic

value, is better, and partly because of the larger prices received for gold fillings. I believe it is a good plan in filling the approximal cavities in temporary molars to fill the spaces as well as the cavities, not allowing the material to impinge upon the gum. This makes all solid, and prevents any food from lodging. I do not think it is at all necessary to subject these little patients to the formalities of the use of the rubber dam or to make much effort to keep the work dry in any way.

I have found the phosphate cements, particularly Flagg's, very excellent for large cavities in the grinding surfaces in both the temporary and permanent teeth.

As to separations, if it is correct practice to cut away the distal surface of the temporary molar in order to prevent decay on the anterior surface of the permanent molar, why is it not equally good practice to treat the temporary molars in the same way, leaving contact points at the necks? We should secure the same results: decay would be prevented. I also think that we should separate the upper temporary incisors, making a clean division. But as to timely separations, we have to lament and to contend with the fact that young children are seldom brought to us until their teeth have already become broken down by decay.

It is very pleasant to hear so much said in favor of preserving the sixth-year molars. In my judgment it would be preferable to loss any of the teeth back of the canines rather than these. The first molar gone, the bicuspids and second molars tip so much as to cause the loss of a large portion of the masticating surface and a considerable shortening of the features (bite). In extracting to relieve a crowded denture or for extensive approximal decay, if the second molar is decayed, and if there is a good degree of certainty of success in saving the tooth forward of it, I prefer to extract that tooth rather than the first molar. The wisdom-tooth will then move readily into its place and a continuous row will be maintained. The general tendency of unsupported teeth is to move forward, as has been stated, but they will also move backward if unopposed in that direction. In covering the pulp-chamber of pulpless deciduous teeth for the purpose stated, I may say that I do not use a metal plate or cap. I prefer gutta-percha, softened and shaped in the cavity, then cooled before filling over it. This is sufficiently stiff to resist the pressure of filling and is more simple to apply.

There are two more points that I wish to make for a moment; one is, that if there is a marked predisposition to decay, or even if it is not specially marked in early life, I do not believe that we do well to try to preserve all of the teeth. Then the question arises, What is "judicious extracting?" It is evident that almost every case

must be settled upon its own peculiar merits or conditions. But each case should be well pondered, for by the decision very great good on the one hand, or great wrong and harm on the other, must result. The other point is, that I feel that we ought, in our care and the treatment of the teeth of the young, to insist that, for our own protection as well as for good of the patient, sufficient time and the right time shall be given to the matter. The whole thing is too much left to Saturdays, to holidays, and vacations. Scores of children lose their teeth because they must not remain home a day from school, or because they must go to boarding-school just such a day. Then, if taken to the dentist at all, he is held responsible, when the odds already are fearfully against the very best skill.

Dr. C. E. Francis. I was very much interested in Prof. Darby's paper; also in the remarks of the gentlemen who followed him. He has laid much stress upon polishing teeth, which I heartily believe in; and especially should we polish the approximal surfaces when they become discolored and eroded. Dr. Dio Lewis once said that if the teeth could be kept perfectly clean they would never decay. There is a great deal of truth in that assertion. If the teeth could be kept perfectly clean, and their surfaces well polished, there would be comparatively few cavities. It pleased me also to hear Prof. Darby advocate the filling of children's teeth with plastic stoppings. I have for years advocated this practice. A great many years ago, I read a paper before our old Brooklyn Dental Society upon the treatment of children's teeth, and at that time I advocated the filling of approximal cavities in the teeth of young people with gutta-percha stoppings. This was long before the preparations of zinc came into use. I used gutta-percha very extensively, and with the best results, although I felt grieved at times, when children for whom I had operated passed into the hands of other dentists, to have such operations condemned, and to be told that the teeth should never be filled with vegetable preparations like gutta-percha, which, it was claimed, would decay. Still, I repeat, I have had the pleasure of seeing very excellent results from such a course of treatment. I have in my mind now a lady who, when quite a young child, had cavities on the approximal surfaces of nearly all her upper teeth,—the bicuspids and incisors and several of the inferior teeth. I filled them with gutta-percha, and she has to-day thirty-two beautiful teeth, as white and nice as any one could wish. Her incisors are at this time filled with gutta-percha, and most of the fillings have been in fifteen years or more. Only a few days ago, a young lady came into my office, whose temporary teeth decayed when she was quite young, which I filled with gutta-percha. Her permanent teeth were attacked with decay almost as soon as they appeared beyond

the surface of the gums, and I filled them in the same manner. I told her mother that when she reached her twentieth year, I doubted if she would have a tooth in her mouth. She is now considerably over twenty years of age, and retains her teeth, which are in excellent condition. A number of the fillings I have replaced with gold. Dr. Dunning, Dr. Foster, and others adopted the same course of treatment. This little incident occurred some years ago: A young lady came into my office who had been a patient of Dr. Dunning. He had filled some of her teeth several years before, among them a lateral incisor with a cavity on each approximal surface. The smaller cavity he filled with gold, the larger cavity he filled with gutta-percha, thinking, I presume, that the tooth was not sufficiently calcified to fill so large a cavity with gold. When she came into my hands, the cavity he had filled with gutta-percha was in perfect order, but the gold filling had failed, the tooth having decayed all around it. We all know that Dr. Dunning was a very safe operator.

Dr. J. W. Clowes. Mr. President, I did think that I had been heard enough of lately, perhaps a little too much; but somebody has been whispering "Clowes" around here, and I suppose I must pay a little attention to it. I rise, in the first place, to express satisfaction that some of my friends have become men of observation. They have discovered what I found out,—Oh, so far back I can hardly remember—that *the teeth move forward*, that they travel toward the front—that they are itinerants with tendencies almost always to advance. I recollect seeing, at least thirty-five years ago, *a dens sapientiæ*—the intervening teeth having been removed—that *had come close up to the canine.* I think this established the fact of teeth being travelers, and of their forward movement. It pleases and encourages me to have my opinions verified, and to know that those who indorse them are with us to-night. Not over a month since one of these gentlemen felt called upon to speak plainly in reference to my paper on dental culture, and expressed great anxiety that "it should be severely handled before going out to the world on its mission of mischief." Now—like a man—he places his shoulder to *my* wheel—subscribes to the chief article in my platform—declares *separation* to be healthful, and says it should be done early, even *so* early as to *anticipate* decay itself. This is a beautiful faith. Its advocacy does him credit, and puts his professional soundness beyond dispute. Our essayist has also told us something about separating; he "would do it just a little, and polish very much." Conservatism holds him and he fears to be rash. He is a hero acting under restraint. He has given us much that is good, but time and thought will improve it. He "separates where there are indications of and tendencies to decay." Tendencies indeed! *As early as the fourth*

year not only the tendency but the actual presence of decay exists among the first set of teeth. He will learn this by and by and advance his lines. His paper is of more worth for what it foreshadows of progress and expansion in himself than for anything it proclaims. To my other friend (who from a state of lethargy was, by "absurd words," aroused to wakefulness) I say—as long ago I said—that *contact among human teeth is always dangerous.* This fact is shown and its lesson taught by almost every mouth. When teeth are naturally apart they are and will remain sound; when in close contact they are or will become decayed. *This is the general rule, and its exception exists only by reason of inherent strength.* The "absurd words" had special reference to extracting temporary canines that the permanent laterals might come in. This practice, to those who move in ways antique, of course is heresy. To myself it is a portion of the gospel of dental truth. Long time I declined to adopt it, and why? Because somebody else declared it wrong. Betimes I had an *independent* thought and jumped the track—the out- and income of which has been regularity and space among my patients' teeth. My thoroughly aroused and awakened friend asserts that he "never saw a case where the bicuspids came in *later* than the canines." This has its explanation in his not keeping his eyes open. I claim a new and improved system of "oral gardening,"—let him practice it and see. I know that generally the bicuspids appear before the canines; but the extraction of temporary canines hurries up the permanents, and under such conditions they will sometimes precede the bicuspids in eruption. In my paper on this subject I have been very careful and guarded in expression, and I beg of those who read it *to commit no blunder in my name.* Do nothing that good judgment decides unnecessary. I have set down naught I would wish erased. In reference to this matter of regulation, I say, follow it up and out to the end. Commence at the beginning, and close with the extraction of sixth-year molars, as explained and directed, and the doctrine I have promulgated will be found correct. Commence with me, lose heart in your task, fall out by the way, and you will richly deserve the execrations of mankind.

Dr. Kingsley. If Dr. Clowes were not really in earnest, as any one can see, I think it would be said that he was intending this as a burlesque. The idea that the extraction of the temporary teeth long in advance of the natural time of shedding will tend to the earlier eruption of the permanent ones is folly. I have no answer to make to that, except that the result of thirty years of observation, confirmed by the observation of probably every other close observer, is that we do not agree with Dr. Clowes.

Adjourned.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular meeting Tuesday, March 6, 1883, at 8 o'clock P. M.

The president, Dr. A. L. Northrop, in the chair.

"Incidents of Practice" was called.

Dr. V. H. Jackson. I have a case of facial neuralgia, which had been under a physician's care for several weeks when brought to me. The patient had also been under the care of a dentist, who had placed a gold filling in the distal grinding-surface of the first right superior bicuspid. The patient stated that this tooth seemed to be elongated, and gave him considerable trouble at times; that the congestion and soreness seemed to disappear and return again; that he did not feel that the dentist he had employed could better his condition in any way, and so came to me for assistance. I took hold of the case with some reluctance, and finally removed the filling. I found that the tooth was exceedingly sensitive, both to the touch of the hand and the instrument; simply the drawing of the excavator across the surface of the tooth next to the gum, seemed to give a shock; and he could not blow his nose on account of the excessive shock, as he described it, which the act caused, and he avoided it because it was so painful. After removing the filling I treated the tooth with carbolic acid, at first, with apparent relief of the soreness and congestion of the periosteum, so that he was able to chew without difficulty. A physician who was treating the patient at the same time, thought the pain was not due to the tooth, but after my treatment had relieved him so materially the patient thought differently. I treated the gentleman for four or five days, when the same difficulty reappeared. I continued the treatment, and gave him decided relief, as at first. I then capped the nerve, and put in a phosphate filling over the cap, mixing the oxide of zinc with a little carbolic acid, which method I have used very successfully. After five days, I think the sixth day, the patient reappeared, and said he was going to have that tooth out, as he had stood it as long as he could. I thought the neuralgia was due to inflammation caused by cemental growth, and, after much consideration, I extracted the tooth. I found quite a considerable cemental growth adherent at the apex of the root, which I removed, and persuaded the patient to have the tooth reinserted. I filled the nerve-canal, and also the apex of the root, with tin foil, and reinserted the tooth. That was day before yesterday, and the patient came to me this morning and reported that he has no inflammation there and that his difficulties have left him, as he expressed it, and there was not much soreness in the gum nor about the tooth.

Dr. Chas. Miller. Was the pulp living at the time you extracted the tooth?

Dr. Jackson. The pulp was living, and quite sensitive. I could not find any place where the pulp was exposed. I do not feel that I have seen the end of this case, however, although there is no indication of future trouble; but there has been trouble about it for so long that I thought that perhaps it might recur in some other tooth.

Dr. J. M. Howe. I would like to know how the doctor removed this cemental growth?

Dr. Jackson. I merely filed it away, just as you would in resetting a tooth. The apex was filled with tin foil.

Dr. W. H. Atkinson. Mr. President, I know what it is to be in trouble myself, and to ask for assistance and not find any; and I know what it is to ask for assistance and to find the proffered assistance a detriment to me. To lead your minds a little in the direction of an explanation, I will tell you what I suspect in this case. I suspect some sore on some part of the mucous membrane of the patient's body, and a translation of the irritation caused by it to this tooth, for some reason, possibly a thermal shock from that large gold filling which the doctor says was in the tooth and near the pulp; and, in that case, the cure would be to cure the ulcer, wherever it was. The local treatment would be hot or cold applications, whichever might be comforting to the patient, persisting in them until a decided change has occurred. If the occlusion of the teeth was as unbearable as the description would indicate, it would be advisable to incase the tooth with gutta-percha; and, in case of the teeth being so well occluded as to make that difficult, then I would build a barrier of gutta-percha on some of the back teeth to prevent the occlusion of the opposing teeth on the sore one.

I receive many letters asking questions that are just about as clear as this is from the statement that has been made; very important matters being unnoticed, such as the age of the patient, and his condition of health or otherwise. The fact of this patient being in the hands of a physician is pretty good evidence that he knew there was something the matter with him before. Suppose he had a chancre, and that had caused irritation of the mucous membrane, from taking cold, and the irritation had been translated to that tooth. I have seen cases of soft chancre where the irritation was translated to the teeth and became very unbearable. Even medical men who are specialists in the treatment of skin diseases have very little knowledge about the sympathies existing between the mucous surface and the products of the mucous surface, such as the teeth and the skin.

Dr. Latimer. I wish to speak of a case of severe facial neuralgia, in my own family, in a lower molar tooth which I built up four years

ago with oxyphosphate of zinc. The tooth is giving very severe pain, and has been doing so for about two months. The neuralgia, however, was caused by a very severe surgical operation which was performed something like two or three months ago, and locates in that tooth incidentally. I have examined it carefully for any particles of food lodged between the teeth to cause pressure and induce periosteal inflammation, but there is nothing of the kind apparent. It is probably neuralgia caused by the severe surgical operation that was endured, and the repair of tissue made necessary by that operation. The pain comes on the side of the head, dwelling around this tooth, is very persistent, and is relieved only by the application of a hot bottle to the side of the face and the essence of peppermint applied to the gums and over the side of the face. I have reason to think that the essence of peppermint is very beneficial in such cases. In this case the use of opium is made necessary, about fifty or sixty drops a day, to keep the patient within bounds, so that she can endure the severe pain.

The President. Is the pulp alive?

Dr. Latimer. The pulp is alive. The extensive filling in the tooth has heretofore given no trouble, but has endured mastication for four or five years, and is in a healthy mouth.

Dr. Wm. H. Atkinson then read a paper entitled "Alveolar Abscess."*

Discussion.

Dr. Latimer. I first used permanganate of potassa some years ago, when it was sold through the South under the name of "Driggs's Prophylactic Fluid." I first saw it used in the treatment of a bed-sore, and was so much pleased with its action that I began employing it in cases of indolent abscesses and ulcers. It is an excellent antiseptic. I have used it generally in dental practice. In cases of alveolar abscess I pass the tube of an empty dental syringe through a cone-shaped piece or cork of soft rubber, and press the cork tightly into the cavity in the tooth; then, withdrawing the piston, the pus is sucked out. Next, taking into the syringe a weak solution of permanganate of potassa, I inject it, withdrawing the piston as soon as the patient shows signs of pain. As the treatment progresses, the solution used is made weaker. I prefer this agent to chloride of zinc.

Dr. J. M. Howe. Will Dr. Atkinson state the manner in which he scarifies the cementum for the relief of inflammation?

Dr. Atkinson. I first pull up the lip and stretch the mucous membrane over the site of the inflammation, then take a sharp, strong-bladed knife and cut right through the mucous membrane, gum, peri-

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* See current number DENTAL COSMOS, page 631.

osteum, bone, and pericementum, and well into the cementum, being sure to make the slit in the gum long enough to prevent the formation of a sac and induce the infiltration of fluids into the surrounding tissue, and at the same time to avoid cutting through the dental ligament at the margin of the gum. Generally speaking, the alveolar process will be so thin and soft that you will hardly appreciate its presence at all, but when you get into the cementum you will find that it will hold the blade of the knife, just as if you were cutting into a piece of dense rubber, such as we use to erase marks on paper. Draw the knife down as far as you please, only being careful not to disturb the dental ligament where the pericementum and the edge of the alveolar process unite, never cutting clear through the festoon of the gum. In going up to the end of the root it is better to cut three times farther than necessary than not to cut far enough. The object is to get at the point of the root, but, if the pulp is living, you must not go over and cut the pulp as it comes in at the foramen, but cut as near it as may be without injuring it. Oftentimes before you have removed the instrument the patient will give a sigh of relief; when you hear that peculiar grunt of satisfaction you may know that the tension is relieved, showing at once that it is the pericementum that is involved and is the site of the mischief. By reason of that structure being so dense, the solid mass of congestion impinges on the sensory nerve and the little nerve-tracts to an unbearable degree, giving the agonizing pain that accompanies this disease. There is one special precaution necessary with anyone, and that is, to be careful that you make your slit in the gum long enough so as not to get a pocket into which blood will extravasate; and to avoid that you want to stretch the mucous membrane up and cut long enough so as not to make two cuts through the mucous membrane; but make two or three cuts through the cementum, so as to get at the site of the mischief; go through the alveolar process into the cementum on one side, and then do the same on the other side of the root. I think I have had as great success as in any locality in the palatal roots of teeth—first and second molars—where there was no inflammation at all on the buccal roots, and where the cementum of the buccal roots was not involved at all.

Dr. Hodson. How do you keep clear of the blood-vessels lying in the palatal region?

Dr. Atkinson. There is no artery in the territory of which I am speaking; there are a few blood-tracts, or rather sinuses, similar to varicose veins, in the vicinity of the apex of the root. If you will go far enough up, where the palatal plate of the superior maxillary bone joins the alveolar plate, right at the corner of the roof of the mouth where the alveolus starts, you will find a very large venous

tract. I have opened it, many a time, when the swelling of the gums was so great as to obscure the parts and its locality was not so easily determined. The swelling, however, usually pushes this venous tract out of the region into which we want to cut. If you do happen to cut into that venous tract you get a very dark, grumous blood, and not a clear, scarlet blood, such as always comes from a wounded artery. The blood coagulates, like that found in varicose veins or hemorrhoids, where this enlarged chasm is situated. You need not be at all afraid of cutting there, if you will cut directly over the line of the palatal root, because it is not a great way in there. It is very thin,—the whole plate is usually deprived of its lime-salts, so that it is easy to cut, and the more we work at it the more familiar we become with the locality.

Dr. Hodson. In the treatment of necrosed bone, how does Dr. Atkinson avoid the possibility of septicemia through the absorption of disorganized pus into the blood?

Dr. Atkinson. I could not take that into the range of possibilities if my instructions were followed. In the paper I said the method was to lay open the soft tissues with the knife, then put your little silver instrument in and peel up the soft parts, including the periosteum and osteoblasts; peel them up until you are sure you have got beyond the line of the disease, then apply your engine-bur, having it move quickly and you will soon detect whether you are in the necrosed portion or the living portion of the bone, for the living portion gives a beautiful, velvety feeling. And you will see come out a very florid blood,—arterial, not venous. Do not wash it out too vigorously, but allow it time to drain. Coaptate the margins of the wound, and, if they are disposed to gape, take a stitch in them; then take a pack of bibulous paper of six or eight thicknesses, smeared with a paste of tannin and glycerin, and lay it on the wound.

Dr. Dexter. As I understand Dr. Atkinson, he uses chloride of zinc in the treatment of alveolar abscess because a certain solution of it produces just exactly that degree of coagulation of albumen which most fits it for appropriation by the tissues.

Dr. Atkinson. Certainly.

Dr. Dexter. In other words, he uses chloride of zinc because it coagulates the albumen. Why does he, then, in his description of the values of other remedies, exclude every other agent which will coagulate albumen?

Dr. Atkinson. I mean that whatever good they do is not equal to that which springs from the chloride of zinc. I do not want to say that escharotic treatment is downright malpractice; but I will say that escharotic treatment is short of the best practice.

We are dealing specifically with acute alveolar abscess, and chlor-

ide of zinc always acts best under the influence of a pretty high degree of inflammation, and a high degree of inflammation is accompanied by a low degree of molecular action and nutrient action. If we have this condition, we have a condition, not of receiving, but of throwing off. Under such circumstances there is always a radiating of the thermal currents, throwing off effete matters and rendering absorption impossible, by which alone septicemia could result. There is no liability to take up anything, even if there were open blood-tracts there. If the blood in the blood-vessels shall have been so changed by the retrogressive metamorphosis as to become sanies, then you have septicemia; there will be septicemia from absorption where the venous tracts have been opened and sanies and ichorous matter taken into the blood from old ulcerous wounds, as seen in military surgery.

Dr. Dexter. If chloride of zinc is used because it coagulates albumen, why cannot something else be used that coagulates albumen?

Dr. Atkinson. I would use chloride of zinc because it is capable of coagulating albumen in that degree which makes it gluey, and does not burn it. The other agents named coagulate the albumen to a degree that burns it and makes it like fatty matter and not capable of being built up into tissue, and it must be got rid of before the remedial process can proceed. Is that clear?

Dr. Dexter. Not to me, sir; because I know that the degree of coagulation of albumen depends upon the degree of strength of the agent used, whatever it is—whether chloride of zinc, silver nitrate, permanganate of potassa, carbolic acid, or other agent; and you need not burn the albumen if your agent is of the proper strength to give the glutinous property, instead of having the strength of an escharotic.

Dr. Atkinson. Hence I was careful to say normal coagulation, and not escharotic action.

Dr. Dexter. Then, supposing we have a patient on whom we cannot use chloride of zinc,—according to this doctrine he must lose his teeth, or else let nature cure his abscess for him. I have a patient whom zinc cannot touch without bad effect. If he uses the zinc salts in any manner he suffers with an eruption of the skin. What shall I do with him, should he develop an alveolar abscess?

Dr. Atkinson. There may be certain idiosyncrasies of constitution with which certain remedies are incompatible. You know I have defended creasote, and I use it in its proper place, but not in alveolar abscess; I have defended its use for other purposes, sometimes for soothing purposes. But what is creasote? Creasote is made up of cresylic and carbolic acids, as they come from the distillery, and that which is derived from petroleum and which operates so

much better than the wood creasote, is preferred by most dentists, especially the English dentists. Why these things act as they do I do not know; I do not know causes, I know only antecedents and sequences. I detailed a case before this body not long ago, and I stated to you why I preferred to use eucalyptol, and that I used it in a certain case not suspecting it was escharotic at all, but in that case it proved to be escharotic and highly painful. Take another example of idiosyncrasy with regard to the egg. I know a lady who cannot eat an egg in any shape. Efforts have been made to cheat her by giving her egg in different forms without her knowledge, but she will always be sick after it. It is a peculiarity of constitution which I do not understand. If you have cause to fear the zinc, use 95 per cent. alcohol and inject it through the fistula until it comes out, and you will in all probability accomplish your purpose.

Dr. Dexter. I understood the doctor perfectly. I am not taking any exception to his preference for chloride of zinc, but I do not like to hear him say that nothing else will do in these cases. He knows and I know that other things will do. Permanganate of potash, that Dr. Latimer spoke of, is an excellent thing.

Dr. Atkinson. What solution?

Dr. Dexter. A weak solution; about 30 per cent. of water.

Dr. Atkinson. It would cut you all to smash.

Dr. Dexter. No; I used it last night in an ulcer in the vagina—all the water would take up; a perfectly saturated solution.

Dr. Atkinson. You will get a nice pickle from that.

Dr. Dexter. It will cook the albumen. Chloride of zinc, permanganate of potash, are all good in their places, and Dr. Atkinson knows it; and I do not want Dr. Atkinson to say that nothing else but chloride of zinc can be used, as he has in the paper. I am going to take it to him afterwards to correct, but I want him to say it now.

Dr. Atkinson. When you get alveolar abscess in the uterus, or a similar condition, then you can use permanganate of potash with 30 per cent. of water.

The President. May I ask for Dr. Dexter's understanding of the purpose for which Dr. Atkinson uses chloride of zinc?

Dr. Dexter. I understand that he uses a chloride of zinc solution with which to wash out an acute alveolar abscess tract after he has opened into and cleared it from effete matter.

The President. I understood Dr. Atkinson to say that after he had opened the abscess, and with a bur cut away the effete bony substance, he then introduced chloride of zinc for the purpose of making it heal by first intention.

Dr. Dexter. The president has put my meaning in better words.

Dr. Atkinson. Often, after burring out the dead parts and re-

moving the débris, I leave it without washing for nature to heal without any further interference. If this were on the outside there would be a scab, and you don't want to take a scab off every day to see how it is doing, unless you want to have a deep pit, such as you see in smallpox and other instances of phlegmonous inflammatory action. Every process of reproduction of tissue, wherever located, operates on the same principle of metamorphic change as occurs in the fetus in the uterus, where the tissues are originally formed. Protoplasm is converted into embryonal corpuscles, which are then converted into tissue.

The society then adjourned.

JAMES E. DEXTER, *Secretary.*

THE NEW ENGLAND DENTAL SOCIETY.

THE New England Dental Society (formerly the Merrimack Valley Dental Society) held its first annual meeting under its new organization, at Franklin Lyceum Hall, Providence, R. I., October 4 and 5, 1883.

After routine business, the election of new members, etc., an amendment to the by-laws was adopted, limiting admission to active membership in the society to graduates of medical or dental colleges.

At the afternoon session of the first day, Dr. James E. Garretson, of Philadelphia, Pa., delivered an extemporaneous address on the subject of "Dentition," with chart illustrations.

Dr. Geo. A. Mills, of New York city, read a paper entitled, "Pyorrhea Alveolaris, its Origin, Etiology, and Treatment."

Dr. George L. Parmele, of Hartford, Conn., discoursed "Concerning Records," and claimed that for the dentist, whose work was of great variety, with frequent sittings even for a single patient, it was extremely desirable that he have a simple and effective method of recording the nature of the operation, charges, etc. His methods embodied an adaptation of the catalogue system in use in public libraries, with such modifications as the technicalities of the profession required.

At the first day's evening session the following were elected delegates to the American Dental Association, which meets at Saratoga next August: Drs. H. A. Baker, Boston; G. A. Gerry, Lowell; J. W. Palmer, Fitchburg; S. G. Stevens, Lynn; J. F. Adams, Worcester; J. P. Dennett, Gloucester, Mass.; C. G. Davis, New Bedford; J. W. Curtis, Brunswick, Me.; S. T. Hodge, Burlington, Vt.; C. W. Clement, Manchester, N. H.; D. B. Ingalls, Clinton, Mass.; E. B. Davis, Concord, N. H.; J. H. Alexander, Mystic River, Conn.; F.

Searle, Springfield; Wm. Barker, Providence; C. H. Hayward, Peterboro', N. H.; J. K. Knight, Cambridge; Geo. C. Angell, Boston; R. F. Horne, Watertown, Mass.

Dr. J. L. Williams, of New Haven, Conn., read a paper upon the subject of "Embryology," with special reference to the development of the teeth. The stereopticon was employed for the enlargement and more perfect exhibition of the natural objects used in illustration of the subject. The importance of correct knowledge was recognized, and the entire process of development, from the germ, of the human dental organs was shown as exhibited in the head of an embryo infant of three months' development, up through the slowly developing human organism.

At the morning session of the second day the following officers were elected for the ensuing year: William Barker, president; James Lewis, first vice-president; J. B. Coolidge, second vice-president; A. M. Dudley, secretary; G. A. Gerry, treasurer; G. F. Waters, librarian and microscopist; D. M. Clapp, T. Fillebrown, F. Searle, S. G. Stevens, and R. R. Andrews, executive committee.

Dr. Fifield, of Boston, a surgeon and visiting member, related an instance of disarticulation of half of the lower jaw, which a knowledge of dental science would have prevented.

Dr. Charles T. Terry, of Milan, Italy, was introduced, and at his request the secretary read his paper. The writer had supposed American teeth to be a little the worst on earth, but he had found the people of Italy—a condition even more marked in Switzerland—to possess teeth far worse than those of this country, as a whole. He was told by intelligent people of those countries that the condition of the teeth was owing to the air and water, but examination of the teeth of animals native to these countries disproved this theory. Extremes of diet, among rich and poor, operate disastrously upon the teeth. The peasantry of Zurich drink much sour wine,—almost like vinegar,—the worst thing possible. It takes the phosphate of lime from the stomach, and ruins the teeth. In certain parts of Switzerland the teeth are so soft and crumbly that it is impossible to build upon them; in fact, they are the worst teeth in the world, except that upon the Mediterranean they are nearly as bad. As lemon culture advances in Italy the children eat the fruit, and the acid ruins their teeth, owing to their eating too little food to keep the vital elements properly nourished. In San Remo and Zurich the writer did not see a set of actually sound teeth. Overwork, nervous excitement, etc., are claimed as causing decay in teeth, yet the poorer classes already mentioned never overwork nor worry, and their teeth are in a very bad condition. Swiss dentists, as a class, Dr. Terry had found to be very intelligent.

Dr. A. M. Dudley offered the following resolution, which was adopted by a rising vote:

Resolved, That we learn with sorrow of the demise of one of our honorary members, Professor T. L. Buckingham, of the Pennsylvania College of Dental Surgery, who in years past honored this society with his presence and counsel, and who has passed away in the fullness of years, after a life of great usefulness as a teacher in our profession.

Boston, Mass., was selected as the place for holding the next annual meeting, one year hence.

Adjourned.

SOUTHERN DAKOTA DENTAL SOCIETY.

In response to a call, the Southern Dakota Dental Society was organized and held its first meeting at Watertown, Dakota, on October 24 and 25, 1883. It embraces all that portion of the Territory south of the forty-sixth parallel of north latitude.

The following officers were elected: C. W. Stutenroth, president; W. B. Steere, vice-president; F. O. Sale, secretary; F. W. Blomiley, treasurer; R. R. Buchanan, librarian; C. W. Stutenroth, W. B. Steere, F. O. Sale, O. M. Huestes, and W. H. Brown, executive committee.

After the adoption of a constitution and by-laws, the society adjourned to meet at Pierre, on the second Tuesday in June, 1884.

C. W. Stutenroth, *President*, Watertown, Dakota.

OHIO STATE DENTAL SOCIETY.

The Ohio State Dental Society held its annual meeting at Columbus, commencing October 31, 1883, and continuing three days.

The following officers were elected for the ensuing year: A. Berry, president; C. H. James, vice-president; J. H. Warner, secretary; George W. Keely, treasurer; J. E. Robinson, C. R. Butler, and C. I. Keely, executive committee. Drs. J. Taft and F. H. Rehwinkel were reëlected members of the State examining board.

J. H. Warner, *Secretary*, Columbus, O.

MARYLAND STATE DENTAL ASSOCIATION.

The Maryland State Dental Association was organized at the university of Maryland, Baltimore, October 18, 1883, with the following named officers for the ensuing year:

E. J. Smithers, president; T. H. Davy and D. Genese, vice-presidents; William A. Mills, corresponding secretary; B. M. Hopkinson, recording secretary; O. C. McCurdy, treasurer; B. M. Wilkerson, J. C. Uhler, and R. A. Hungerford, executive committee.

William A. Mills, *Corresponding Secretary*,
Baltimore, Md.

EDITORIAL.

ADDITIONAL PAGES.

This issue contains sixty-four pages, eight in excess of the usual number; an increase made necessary by the amount of matter on hand. Notwithstanding this addition, we must beg the indulgence of contributors. Several articles, already in type, are of necessity laid over. We are also compelled to postpone the publication of a large portion of the report of the American Dental Association.

THE MARSHALL H. WEBB TESTIMONIAL FUND.

The returns made in response to the suggestion of the Dental Cosmos for the raising of a Webb Testimonial Fund amounted to $2066.40, of which sum $316.40 was paid to Mrs. Webb for immediate needs, and the balance ($1750) has been deposited with the Guarantee Trust Company, on interest, to be paid to Mrs. Webb, or, in case of her death, to her children, at the rate of $150 semi-annually, so long as the deposit with the accumulated interest shall last. The subscription list can be seen at the office of the Dental Cosmos by anyone interested.

BIBLIOGRAPHICAL.

The Physician's Visiting List for 1884. Philadelphia: P. Blakiston, Son & Co.

This is the thirty-third year of the publication of this compact and convenient Visiting List. The new features for 1884 include a revision of the posological tables in accordance with the new "Pharmacopœia;" a carefully prepared list of new remedies; Sylvester's method for producing artificial respiration illustrated, and a diagram of the chest as an aid in diagnosis.

Plastics and Plastic Filling, as Pertaining to the Filling of all Cavities of Decay in Teeth Below Medium in Structure, and to Difficult and Inaccessible Cavities in Teeth of all Grades of Structure. By J. Foster Flagg, D.D.S. With illustrations. Second edition, revised. Philadelphia, 1883. Price, cloth, $4.00.

This volume was noticed at length in our pages on the appearance of the first edition. The work is but little changed in character, the additions being merely intended to furnish the latest information on the several subjects treated. The topics discussed are those which are interesting to the majority of dental practitioners, and deserve serious consideration.

PUBLISHER'S NOTICE.

THE DENTAL COSMOS FOR 1884.

The Dental Cosmos has completed its quarter of a century of journalistic life during a period of the greatest advancement both in theory and practice of dentistry in the recognition and appropriation of scientific knowledge, in physiological and pathological research, and in artistic and mechanical acquirements. Of the influence which this journal has exerted in promoting and registering the scientific advancement of the dental profession it is needless to speak. Its pages have contained the best writings of the thinkers and workers who have made dentistry what it is, and but little of value has been developed in theoretical or practical dentistry which is not to be found there recorded. Its past history, however, speaks for itself, and must speak, too, of future probabilities. We are willing that the coming volume shall be judged by the closing one.

In one respect we promise an advance—an increase of eight pages to the reading matter of each number, aggregating only sixteen pages less than two additional numbers in the year. We renew our assurance of steadfast adherence to our hitherto persistent aim to make the Dental Cosmos, first, last, and always, a dental journal. It will be our endeavor to furnish, not what is of value to the dentist as a man or citizen, but what concerns him as a dentist, and if we do not succeed in maintaining it in its place at the head of dental literature, it will not be for the lack of effort.

Nearly all subscriptions terminate with this issue. Those who wish to subscribe or renew will find a prepared blank for the purpose preceding the advertising pages of this number. Prompt renewals and subscriptions are earnestly solicited. The price remains as heretofore—$2.50 per annum. Subscriptions are required to commence with the January or July number.

The S. S. White Dental Manufacturing Co.

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Will some gentleman of the profession who has practiced in Europe tell me whether the teeth of the French, Spanish, Germans, and English are of better quality,—that is, less liable to decay,—than the teeth of Americans?—Z. I. N.

I have a female patient, aged eighteen years, who never erupted her superior cuspids, nor is there any protuberance as sign of them. Her temporary cuspids were extracted eight years ago to give place to the laterals. Is it possible that the germs of the permanent were destroyed by the extraction of the temporary?—W. L. Roberts.

The difficulty of F. R. N., as given in the November number of the Dental Cosmos, can be remedied by using weighted rubber, being careful to have it as heavy as the *comfort* of the patient will allow. If the muscles to which he alludes are on the labial or buccal surface of the alveolar ridge, groove the plate, so that there will be a tendency on the part of the muscles to press it down on the ridge, at the same time being careful to make the plate on the lingual surface of the ridge as *shallow* as the case will allow, in order that any interference of the sublingual muscles may be prevented. Let the teeth so antagonize that the tendency will be to press the lower plate forward and the upper plate backward. I used the above method successfully in several cases similar to the one mentioned. —R. Y. Henley, D.D.S., *Walkerton, Va.*

Capsicum Bags.—Among the many valuable suggestions which Dr. J. F. Flagg has made to the dental profession, capsicum bags are, in the estimation of those who have learned their value, considered as not the least. The writer is thankful for the relief which he has experienced in person and witnessed in his patients from the use of this little device. These bags when applied produce a stimulation ranging in degree from that which is slightly irritant to that which is so decided as to produce suppuration when continued. In all cases their application is the same as regards position,—the linen sides being placed next to the gum just over the affected tooth or root, the seamless end of the bag towards the apex of the root, the cheek or lip being protected by the rubber side of the bag from the action of the contained medicament. In cases requiring more or less continued counter-irritation, as in the conservative treatment of pulps, a No. 2 bag worn constantly, will in many cases prevent undue inflammatory action and effusion. If pulps after capping give slight yet increasing response to thermal changes, a No. 2 bag should be worn constantly in order to counteract incipient inflammatory action. The tenderness about the roots of teeth following the impaction of metallic fillings, the accidental biting on a hard substance, or the overwork of lone articulating teeth, may often be quickly dispersed or much relieved by wearing a No. 2 bag. The soreness about the roots of teeth which is frequently a sequence of wedging in cases of irregularity, etc., may often be much reduced or entirely dispersed by wearing a No. 2 bag. Should this fail to afford relief the employment of cooling lotions and washes should be directed, as also, when indicated, cathartics and general sedatives. Teeth from which the pulps have been extirpated frequently after being filled become tender and sore. In such cases the No. 2 bag

should be applied at once. If, as occasionally happens, the tenderness and pain should be increased by this application, this use of the bag should be discontinued, and resort should be had, after properly venting the tooth, to cooling applications and systemic treatment. If these measures fail in turn, then the application and constant wearing of a No. 1 bag is indicated, with proper systemic and local contributive treatment, should the swelling increase and systemic excitement occur. In these cases it is assumed that proper vent has been given to the tooth, if the soreness increases after the application of a No. 2 bag, or that venting, if at all practicable, would be a difficult and painful operation, which, even if accomplished, would probably not prevent the formation of abscess. It is also assumed that, whether such tooth has been vented or not, it has been guarded from occlusion. In teeth which have been properly vented there is generally no occasion for more energetic treatment than the wearing of a capsicum bag, even, in many cases, to the establishment of a fistulous opening. In that class of cases which cannot be satisfactiorily vented, decided local and systemic abortive treatment is required in order to effect resolution. Frequently, however, all abortive measures fail, and the prompt establishment of abscess presents the only means of avoiding the extraction of the tooth. In such cases a No. 1 bag should always be worn.

An abscess is more or less restricted, more or less difficult to control, and more or less distressing to the patient, according to its position, whether in the upper or lower jaw, in the anterior or posterior portion of the mouth. The temperament and physical condition of the individual, the time of the year, and other circumstances, influence markedly its extent, duration, and the degree of its response to treatment. When attended with much edema and systemic disturbance, the most positive and powerful sedative, astringent, and cooling applications, with direct and continued systemic treatment, are demanded to prevent untoward, even disastrous, results. In cases exhibiting such extreme symptoms, when the effort is to be made toward saving a tooth so involved, the patient should be instructed to partake frequently, in small quantity, of nourishing and easily swallowed food, as light soups, broths, beef-tea, minced rare beef, tapioca, etc. He should also be instructed as to the proper position during rest or sleep When the pain of active inflammation has subsided, and the formation of pus begun, the lance may in many cases be used to anticipate the natural yet more tedious pointing. In some cases a fistula may be at once established by drilling through the alveolar process.

In the case of a tooth having had a putrescent pulp, the tenderness which follows treatment and filling will generally respond very promptly to the application of a No. 2 bag. If soreness and "growling" continue, a saline cathartic may be taken, or one or more doses of bromide of potassium. If, however, in such cases the capsicum bag be applied at the first intimation of trouble, it will nearly always prevent the necessity of further treatment. In the treatment of teeth with putrescent pulps a decided periodontitis is frequently only held in abeyance either by leaving the canals of such teeth entirely open or by dressing them in the loosest manner possible. Such cases should wear a No. 2 bag constantly during the effort to secure toleration by a gradual increase of the tightness of the canal dressings. If all efforts fail, the dressing should be firmly introduced, the cavity temporarily filled, and a No. 1 bag worn as nearly constantly as the high grade of stimulation will permit, removing it at intervals if the pain be too severe.

An abscess, more or less advanced, without a fistula, connected with a tooth which has been filled, is a common form of dental trouble for which new patients or transient applicants seek relief. If the venting of such a tooth is impracticable or fails to relieve, a No. 1 bag should be worn until the lance or natural discharge

afford relief in all cases where it is desirable that the tooth should be saved.

Sometimes patients while having teeth with putrescent pulps treated are compelled to leave home by the demands of business, before the teeth are properly prepared even for temporary filling. In these cases the teeth should be dressed with a temporary material permitting of easy venting, if desired, and the patient directed, upon the first indication of uneasiness about the tooth, to apply and wear a No. 2 bag, or in sluggish temperaments a No. 1, until every uneasy sensation has passed away. Should the application prove ineffectual, the vent should be opened and permitted so to remain until all disturbance has subsided, when the vent may be loosely stopped with cotton. With proper attention to these directions, such cases may be carried along for months without decided trouble.

If the wearing of a capsicum bag increases pain, then its use, except when abscess is desired, is contra-indicated, and cooling astringent and sedative applications should be substituted. This caution should always be given to patients, and as well the direction that, when pain is relieved by their use, they should be worn a few hours or days after the disappearance of the uneasiness, that the beneficial impression be rendered more decided and permanent. Patients sometimes imagine that a capsicum bag, after having been worn for a short period, has lost its strength. This is because the parts have become tolerant of the presence and action of the medicament, and not because of any lessened activity of the capsicum.

It will be understood that the No. 1 bags should contain pure capsicum, and the No. 2 equal parts of capsicum and ginger.

In cases where the stimulation of capsicum bags increases or fails to diminish pain or tenderness, except when the formation of an abscess is desired, the prompt and continued use of a bag similarly made and worn as the capsicum bags, containing soothing, cooling, and astringent drugs, such as chlorate of potassium, hamamelis, and tannic acid, is indicated.—Wm. C. Foulks, D.D.S.

Any dentist who can spare the time may make a considerable saving of money, to say nothing of the satisfaction attendant on the use of tools in order, by sharpening his own burs. The business of the country dentist is quite likely to be broken into by bad weather and inability of people to get to town, so that he will have a good many "off" days in which he can look up various odds and ends.

Now, burs may easily be sharpened several times without recutting, if one has the disposition to acquire the art. First, get a knife-edge Arkansas stone. (I had the ill or good fortune to break mine in two, and I keep one piece for this special work.) To *keep* the knife-edge, renew it when dull by holding it lightly on a small, fine corundum wheel, either lathe or engine. Of course this grinding must be done carefully, to avoid chipping the edge. A whetstone may be used to finish the edge if you wish. Take a pine stick, punch a hole in the end with an awl or other small instrument; then whittle down to a nice round handle to hold your bur. Now, holding the handle between the thumb and three fingers of the left hand, let the instrument itself rest on the index finger. With a little practice the right hand may be taught to hold the stone lightly and draw it evenly through the slots and bearing on each chisel edge. As each becomes sharp, a very slight rotation of the handle from left to right, brings the next chisel into position, and those sharpened are so passed along and no danger of being dulled, as there might be if the bur were rotated backward. Clean the edge occasionally and have a bit of oiled flannel with which to keep it lubricated. The beginner will probably spoil the edge of his stone once or oftener, but if he perseveres he will soon be gratified by the consciousness of having mastered a nice little art.—G. Newkirk.

THE S. S. WHITE DENTAL MFG. CO.,

Inclosed find $2.50, for which please send me the "**DENTAL COSMOS**" for one year, commencing with January, 1884.

Name, ...

Street No. ....

Post-Office, ...

County, ...

State, ...

AN EXPLANATION AND RETRACTION.

It is known to some of our patrons that the business management of this house and its attitude toward the dental profession have been the subject of unfavorable criticism in the journal controlled by T. B. Welch & Son.

We have not thought it necessary nor desirable to notice these attacks as they appeared from time to time, being satisfied to rest our reputation on our record. We think it due, however, not only to the Company, but to the Messrs. Welch, to copy their voluntary card, which appeared in the November issue of the *Items of Interest.*

THE S. S. WHITE DENTAL MANUFACTURING CO.

ACKNOWLEDGMENT.

We feel it a duty to make acknowledgment to The S. S. White Dental Manufacturing Co. for statements made by us in this journal to their discredit. We are satisfied we were in error; that, seeing things in a false light, we were led to conclusions not justified by the facts, and, under the influence of misunderstanding and prejudice, wrote that which we now regret. With a fuller knowledge of the facts, we cheerfully withdraw all imputations of unfairness in their dealings.

T. B. WELCH & SON.

CONE-SOCKET INSTRUMENTS.

A MISAPPREHENSION CORRECTED.

The words "*Patented November* 16, 1880," printed under the head-line of each page, in our "Revised List of Cone-Socket Instruments," published recently in pamphlet form and also in the advertising pages of the Dental Cosmos, have been accepted by some as indicating that the special forms of instruments illustrated had been patented by the gentlemen whose names they bear. We regret that such an impression should have been created in the mind of anyone, and desire it distinctly understood that the patent, which is ours, refers solely to the method of attaching the instrument to the handle.

The S. S. White Dental Manufacturing Co.

THE REGISTER CHUCK HAND-PIECE.

Patented December 27, 1881; March 14, 1882.

At the request of some who wished for a device of this character, we are now placing this Hand-piece upon the market. We consider it better than any other chuck hand-piece yet offered to the profession.

This is a Chuck or Clamp Hand-piece, and is operated by turning one portion of the handle section upon another, making it easy to operate in the removal and replacing of the bits. The tool-holder runs upon stout cone-journals or bearings, and is so organized and adjusted as to readily take up all wear.

It clamps the bit having the ordinary-sized shank, grasping it for about two-thirds of its length, and carries it steadily.

Price $10.00

THE S. S. WHITE DENTAL MANUFACTURING CO.

1000 FINE GOLD FOIL.

TWO FORMS—COHESIVE AND SOFT.

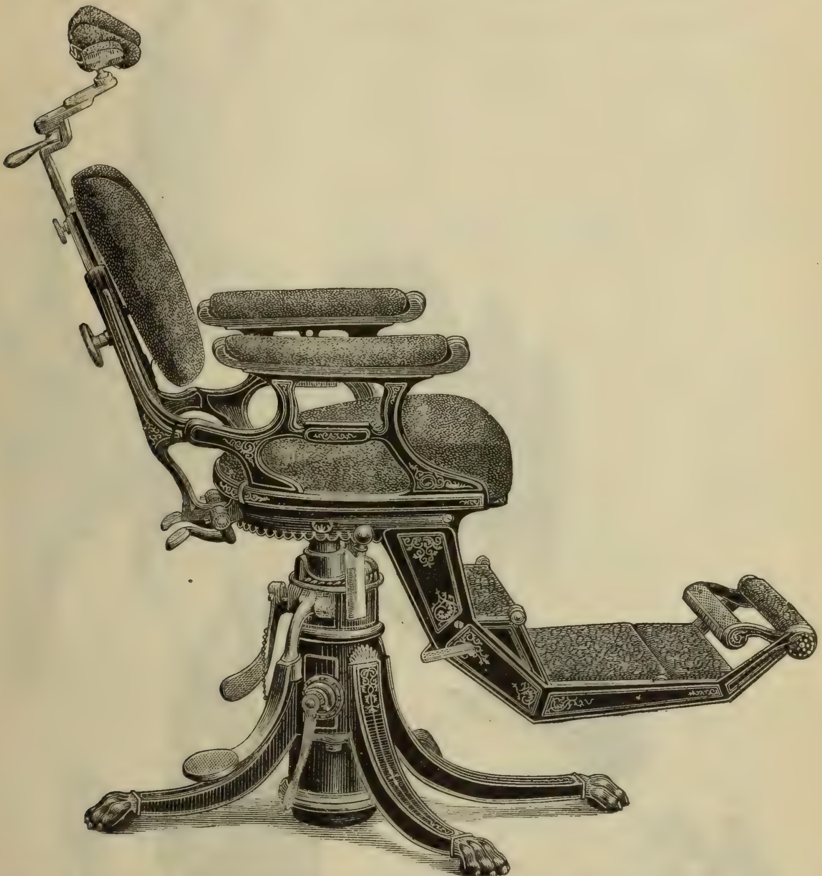
The "1000 Fine Gold Foil" is exactly what its name indicates—absolutely pure. No alloy of any kind is added to produce the qualities which make this Foil so popular. These are peculiarly and distinctively its own, resulting solely from the special care to secure absolutely pure gold, and from the processes by which the Foil is made.

We claim for the "1000 Fine Gold" marked superiority in the qualities most desired by operative dentists; that, in the characteristics which commend it to fine operators it has no superior and few equals. Fully assured of the merits of this gold, we confidently invite a test from those who have not yet used it.

Prices uniform with all our varieties of gold.

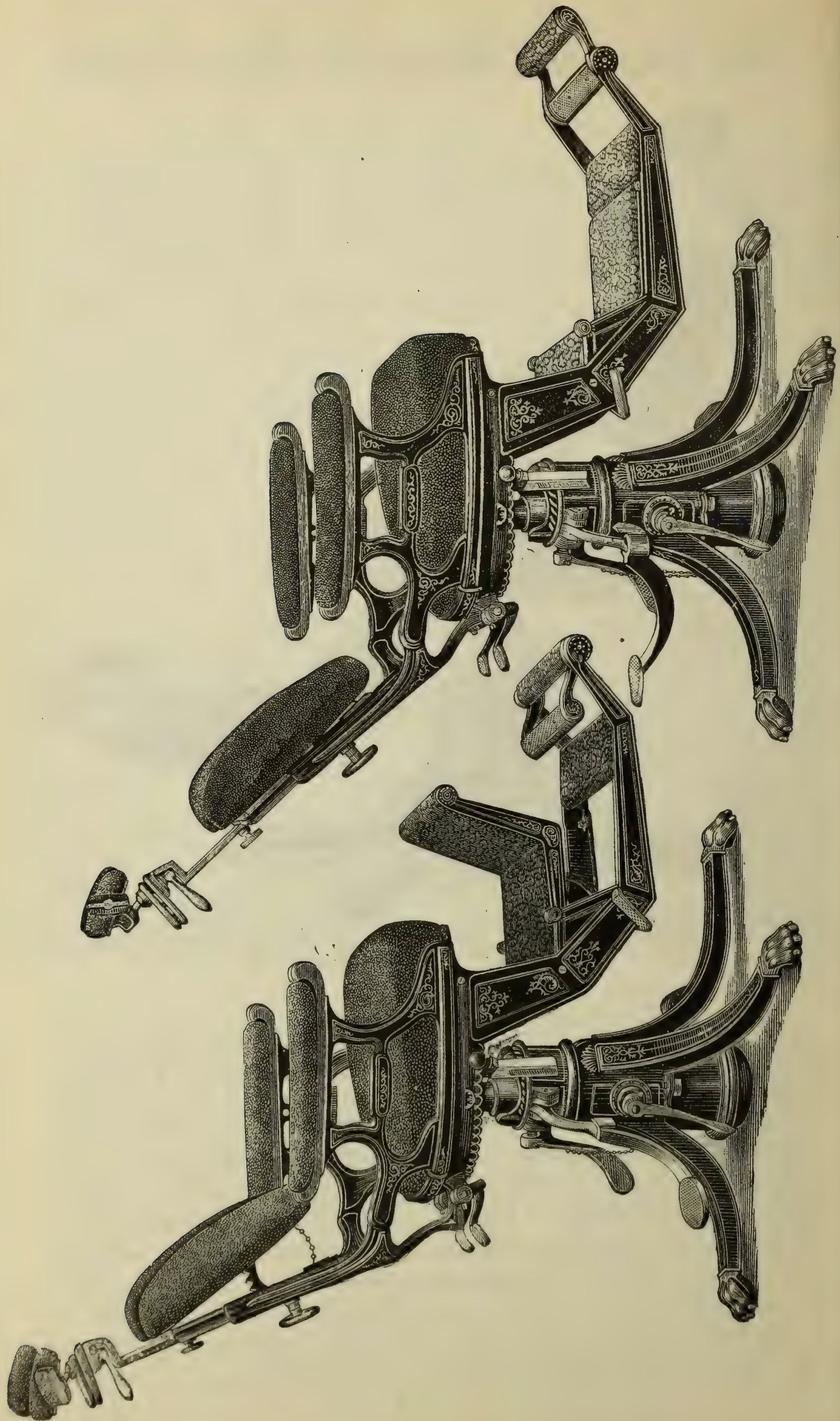
Per ⅛-oz.	$4.00
" ½-oz.	15.00
" 1-oz.	30.00
In 2-oz. lots, per oz.	29.00

The Improved Wilkerson Dental Chair.



Patented October 31, 1876; November 20, 1877. Reissues July 4, 1876; March 19, 1878; June 25, 1878, August 20, 1878; August 27, 1878.

We have made a modification of the Wilkerson Dental Chair, which is calculated to add largely to its efficiency. The modification consists in pivoting the back, so that its angle, relatively to the seat, can be changed at the convenience of the operator. The back is pivoted to the chair-frame, and carries a sliding support to which the back-pad is hinged. The pad has thus a swinging, a vertical, and a horizontal movement, each of which, being controlled by a separate mechanism, is independent of the others. The pivoted back is clamped in any position by the double lever at the back of the seat-frame, which may be adjusted by the foot or the hand. The vertical adjustment is $9\frac{1}{2}$ inches, controlled by the large milled nut; this nut also serves as a handle by which the back-pad is raised or lowered and locked, one hand only being required for the purpose. The pad is hinged at its upper edge to tne sliding frame, and its lower end may be swung



forward when required to support the small of the patient's back, and held in position by a spring-catch, which is released by lifting a finger-piece within the sliding frame, and at the same time slightly pressing the pad forward.

By means of these various adjustments of the back the seat may be lengthened or shortened, and the patient may be inclined at any angle desired.

The arms consist of an iron frame-work cast as a part of the body of the chair, surmounted with an oil-finished walnut block for the attachment of the upholstering. The ends of the block project beyond and above the upholstering, to preserve it from wear at the hand-hold.

The raising, lowering, and tilting mechanism are the same as in the former style Wilkerson chair, as are also the head-rest and foot-rest.

PRICES.

In Best Quality Green, Crimson, or Maroon Plush . .	$180.00
In either color of Finest Plush, puffed with Plush, trimmed with Silk Cord, with Wilton Carpet	200.00
In Fancy Upholstering, puffed with Plush, and trimmed with Silk Cord, with Carpet to match	210.00
In Crimson Plain Turkey Morocco or Leather . . .	180.00
In Embossed Turkey Morocco, Tan or Crimson, puffed with Plain Morocco, edged with Cord, Carpet on Apron and Foot-Rests	210.00

BOXING FREE.

Summer Seats, of Cane	$6.00
Summer Backs, of Cane, including Iron Frame	9.00
Wood Arms, of Polished Walnnt	4.00
Head-Rest, of Polished Walnut, with Netting and Blocks for Arm-Rest	8.00
Linen Covers for Seat, Arms, Back, and Head-Rest . . .	4.00

SPECIAL NOTE.

We have recently purchased some of the "Cupid" pattern Gobelins Tapestry upholstery so generally admired when we had it a few years ago, and we can supply a limited number of Pedal-Lever or Wilkerson Chairs covered with same. Our present stock is in black, light red, and light buff grounds, the figure being the same in all.

Price $225.00

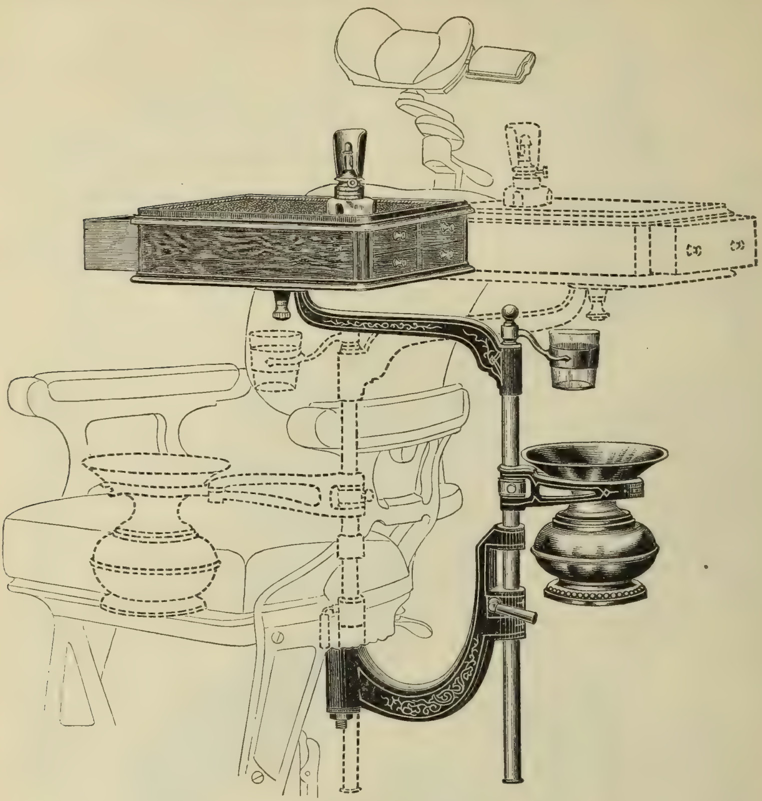
RUBBER DAM.

A FIRST-CLASS ARTICLE.

Thin	per yard	$1.00
Medium	"	1.50
Thick	"	2.00

COMBINATION DENTAL CHAIR ATTACHMENT.

Patented February 8, 1876.



All the best features of several devices which we formerly manufactured are comprised in this attachment, making it, so far as we can now see, a perfect combination for the purposes intended—Tool-tray, Spittoon-carrier, and Tumbler-holder.

A curved swinging crane pivoted to the left trunnion-arm of the chair carries an upright standard rod or support. At the top of the rod is a swinging tumbler-holder, and immediately below it the tool-tray bracket-arm. The tool-tray is attached to the arm with a slide-plate, which gives the tray a sliding as well as a horizontal pivoted movement. The spittoon-bracket has a vertical range upon the standard of twelve inches, and swings freely around it. It is provided with a spittoon-holder similar to that of our No. 2 Spittoon Bracket, and the arm is curved conveniently to allow the spittoon to be swung out of the way, when desired. The standard has a vertical range of twelve inches and is held securely at any point by a clamp-block in the swinging crane. This, with the various adjustments of the auxiliary parts, permits an almost unlimited choice of positions, some of which are shown by the dotted lines in the cut.

This attachment is made in the best manner, and finely finished, the bright parts nickel-plated. It has been adapted to the Improved Wilkerson and Improved Pedal-Lever dental chairs.

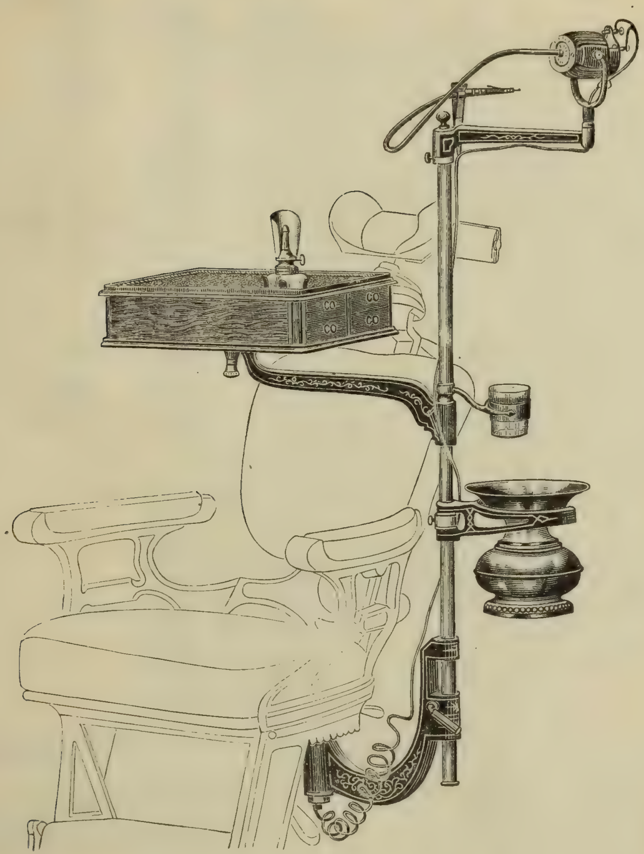
PRICES.

Complete, with Plain Table and No. 4 Spittoon	$30.00
" " Allan " " " (see cut) . .	35.00
" " " " Glass Sides, and No. 4 Spittoon .	38.00
" " Holmes " and No. 4 Spittoon	55.00

Other spittoons may be substituted at value.

Electric Motor Dental Chair Attachment.

Patented February 8, 1876.



This is a device for the convenience of those who use the Electric Dental Engine. It consists simply of a section added to the standard of the combination chair attachment, carrying a swinging bracket-arm adapted to support the motor. The motor can be placed in front of the patient's head, or to either side, as may be most convenient, thus bringing the hand-piece within easy range without the slightest pull or strain on the cable. When not in use it is readily swung out of the way. The connecting cord (see cut) is so arranged as to be out of the way of the operator.

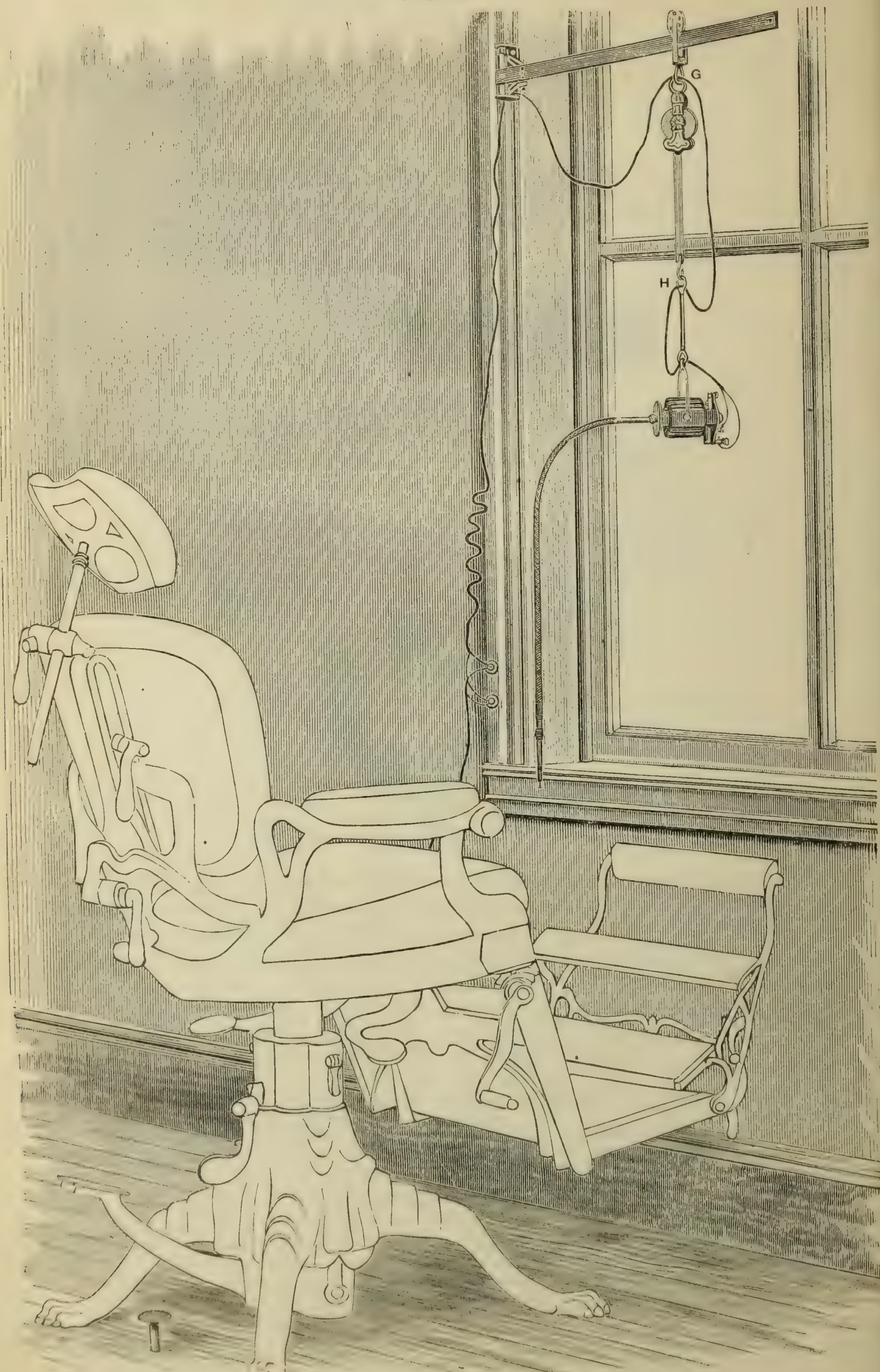
Price, complete, including Electro-Motor Attachment, Electro-Motor, Engine-Arm and Hand-piece, and 3 yards Silk-covered Cord	$42.00

PARTS SEPARATELY.

"	Electric Motor	21.00
"	Engine-arm and Hand-piece	14.00
"	Electric Motor Attachment	6.40
"	3 yards Silk-covered Cord	.60

THE DOUBLE-INDUCTION MOTOR AS AN ELECTRIC DENTAL ENGINE.

Fig. 1.



THE DOUBLE-INDUCTION MOTOR

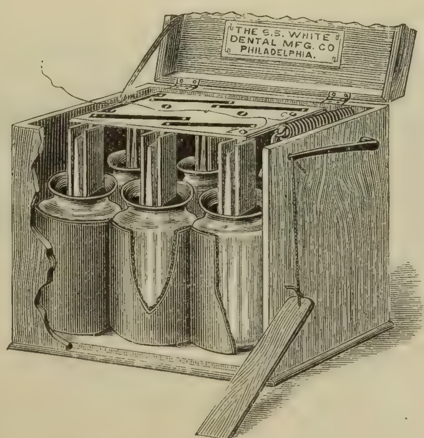
AS AN

ELECTRIC DENTAL ENGINE.

Having arranged with the Electro-Dynamic Co., of Philadelphia, for the exclusive agency of its Double-Induction Electric Motor and Automatic Battery as applied to dental and surgical engines, we now offer them to the profession.

The Motor is compact in construction, strong, and durable,—weight, thirty-eight ounces,—furnishing with the Battery an efficient, economical, and reliable motive-power. The manufacturer claims that with a battery-current of sufficient strength it will lift *two thousand times* its own weight one foot per minute. The power is at all times absolutely under the control of the operator. Thus, by simply pressing a lever or a button, with the foot, a bur may be run at any speed desired up to 10,000 revolutions per minute; and by adding more battery-cells a still higher rate may be attained. It is generally admitted that the pain experienced in the excavation of sensitive dentine is lessened as the speed of the bur is increased. The cable and sleeve used are those of the well-known S. S. White Improved Dental Engine; operators who have the engine need only remove the cable, sleeve, and hand-piece from the pully-head of the engine and attach to the Motor. The shaft of the armature of the Motor is made hollow to receive the rigid end of the cable, and is provided with a carrier-pin, over which the groove in the cable passes; the end of the shaft bears a thread upon which the rigid section of the sleeve is screwed. This combination prevents any vibration being communicated to the hand-piece.

Fig. 2.



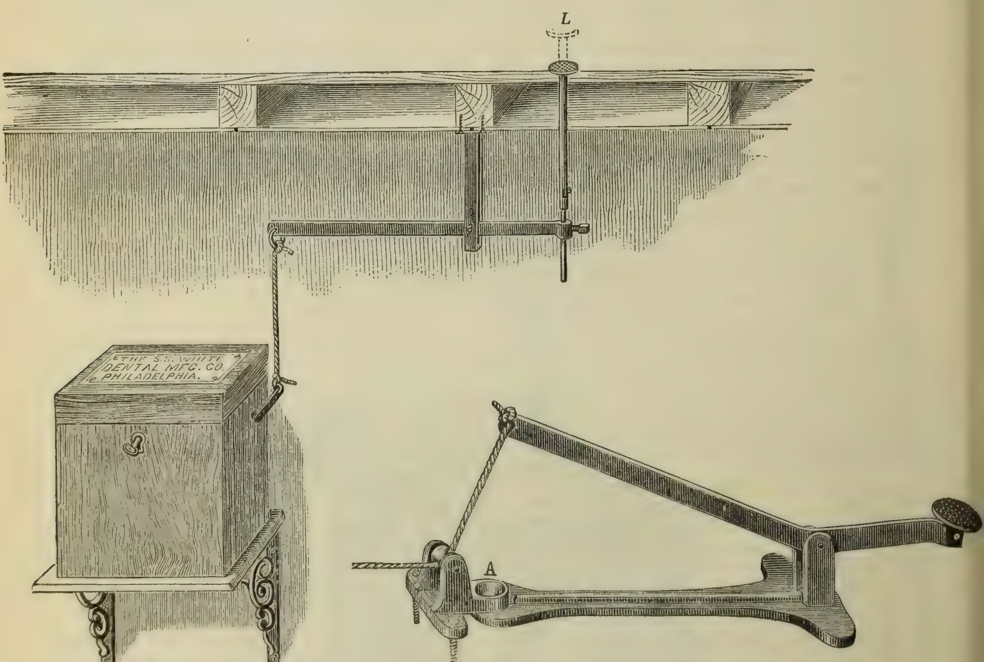
The Battery (Fig. 2) consists of six one-gallon cells, with two carbons and one zinc in each, with an automatic device for removing the electrodes from the fluid when not in use. It is therefore a convenient and economical form of Battery, inasmuch as the plates are immersed only when running the engine; during each

period of rest the Battery recruits its force, the automatic removal of the plates from the fluid preventing polarization. The length of time the Battery will run without recharging will vary, of course, with the work required of it. With careful management, according to directions, it is believed that this Battery will remain effective longer than any other yet offered to the profession. Another advantage of this Battery is that the jars being longer than the electrodes allows the heavier products of decomposition to sink to the bottom of the cells, instead of accumulating around the plates to obstruct action. It is inclosed in a neat box, with lock and key.

The whole organization as applied to the requirements of the dentist and surgeon has been well studied, with a view to make as little show of apparatus as possible around the operating-chair or table.

All parts are made interchangeable, so that any damage can be repaired by the owner.

When the Battery is placed alongside the chair the operator can control it by placing his foot on the wood pedal shown in Fig. 2, but most dentists will prefer having the Battery out of sight, and to provide for this there are two attachments, designated Nos. 1 and 2, as shown below.



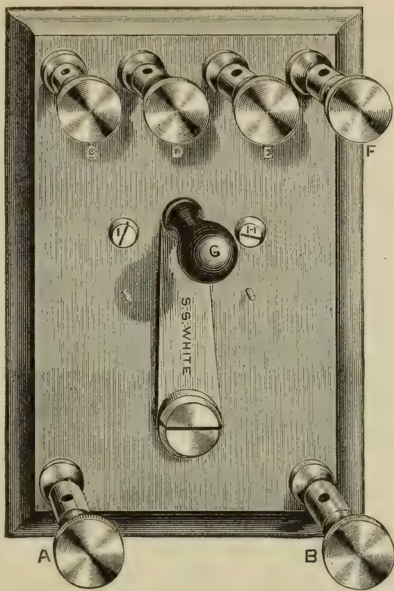
BATTERY ATTACHMENT,
No. 1.

BATTERY ATTACHMENT,
No. 2.

No. 1 is for connection with the Battery when placed in the room below the operating-room, or in the cellar. With this connection, the button only appears above the floor. (See Fig. 1.)

No. 2 connects with the Battery when it is placed on the same floor as the operating-room, say in a closet, the rope being led from the attachment to the Battery, around the surbase, over small pulleys. If the regular length of wires supplied with the apparatus is not sufficient to reach to the desired location of the Battery, extra wire can be supplied at the price mentioned in price-list.

For those who desire to use both the Engine and Electric Mallet with the same Battery, we have provided a Switch-Board.

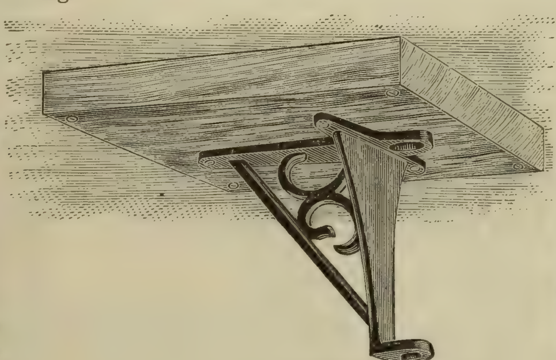


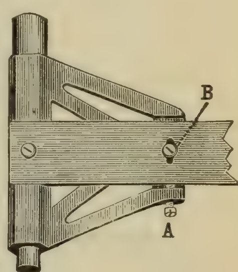
SWITCH-BOARD.

The wires from the Battery connect with the posts *A*, *B*; those leading to the Mallet are attached at *C*, *D*, and to the Engine at *E*, *F*. The electrical current can be directed to either Motor or Mallet by shifting the switch *G* to the screws *H* or *I*.

There are also two attachments for suspending the Motor, designated "Wall" and "Ceiling."

Wall Attachment.





Ceiling Attachment.

Both of these are adapted to hold the crane which supports the fusee or spring-balance to which the Motor is connected.

In adjusting the cord to the Motor, fasten it securely to the fusee at G and H, (*see Fig.* 1), *so as to prevent the spring being drawn out too far.* Disregarding this caution may cause breakage of the spring from its fastening on the cylinder of the fusee.

PRICES.

Nickel-plated Dental Apparatus (including Motor, Crane, Spring-Balance, Wire,—two 15-ft. lengths cotton-covered Copper Conducting Wire, and 9-ft. Silk Double Cord—Battery in Imitation Walnut Case, with Lead Pan, and 5 lbs. Bichromate of Potash)		$50.00
Engine Cable, Sleeve, and Hand-piece		14.00
Complete Apparatus		64.00
Battery Attachment, No. 1	extra	5.00
Battery Attachment, No. 2	"	3.00

PARTS SEPARATELY.

Nickel-plated Dental Motor	21.00
Automatic Battery (six one-gallon Cells, each containing two Carbons $2\frac{1}{2}$ in. wide by $4\frac{1}{2}$ in. long, and one Amalgamated Zinc), inclosed in an Imitation Walnut Box, with lock and handles	15.00
The same with Lead Pan	17.50
Boxing extra on Battery	1.00

ACCESSORIES.

Battery Fluid for six Cells (Six Gallons)		3.00
Six-gallon Carboy, for Fluid		1.50
Bichromate of Potash, finest quality	per pound	.30
Cast Zincs	each	.30
Rolled Zincs	each	.40
Carbons	each	.30
Extra Metal Combs	per pair	.15
Cotton-covered Copper Wire	per foot	.03
Silk-covered Double Cord	per yard	.20
Switch-Board		2.00
Twaddel's Hydrometer, for testing Battery Fluid		.75

Descriptive pamphlet, giving full instructions, sent with each apparatus.

THE S. S. WHITE DENTAL MFG. CO.,

Sole Agent for the DENTAL TRADE.

AGATE CEMENT.

Experience has demonstrated this to be

SUPERIOR TO ALL OTHER OXYCHLORIDES IN STRENGTH, DENSITY, UNIFORMITY,

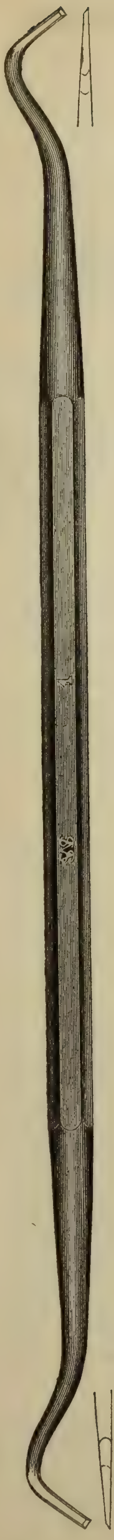
AND

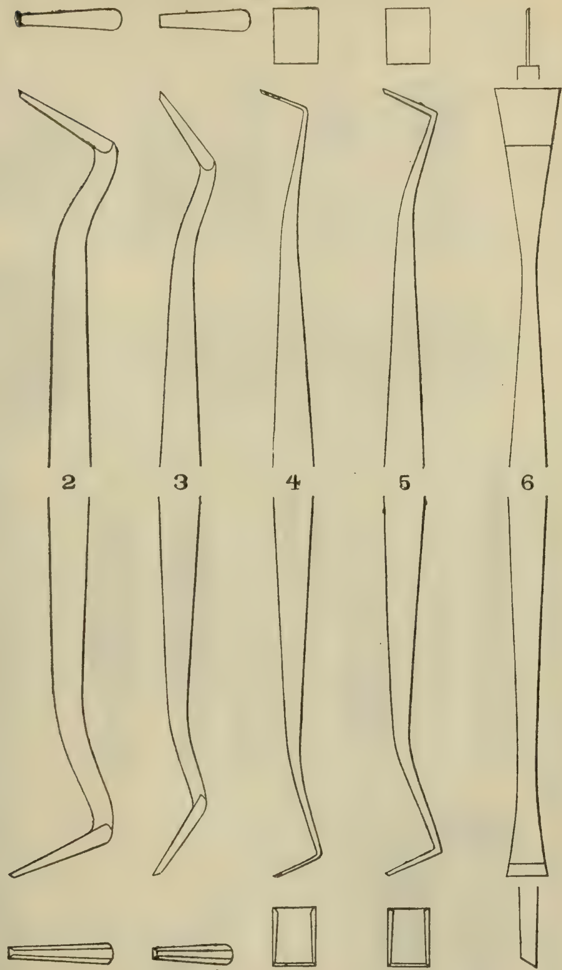
Freedom from Liability to Flake or Disintegrate.

Price, of one-ounce boxes	$3.00
" " half " "	2.00

HEROIC CHISELS.

Patterns furnished by Dr. E. Parmly Brown.





This set of instruments is designed to do nearly all the heavy trimming away of enamel, both on the exposed surfaces of the teeth, and on their approximal surfaces. Many of the points are also valuable for scaling calculus, and removing stains.

The forms of the heavy points will explain their uses, for "Heroic" chiseling; the thin blades only to be used where necessary on account of limited space between the teeth.

These instruments should not be touched often to the oil-stone; but once a month or so should be sharpened on the finest corundum wheel on the foot-lathe.

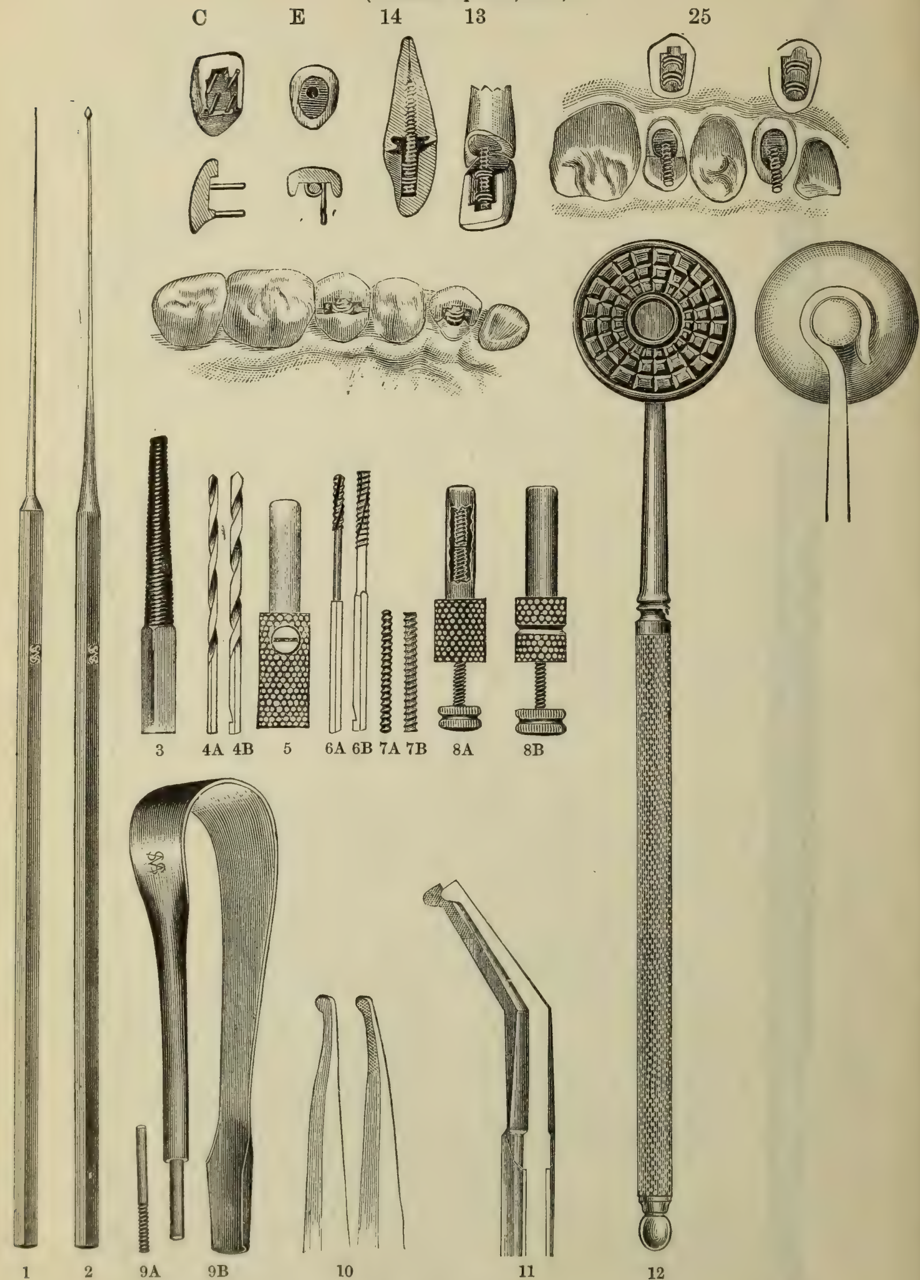
Price	per set	$9.00
SINGLY:		
Nos. 1, 2, 3	each	$1.50
" 4, 5, 6	"	1.60
Morocco Case, lined with Cotton Velvet, with separate space for each instrument . . .		2.50

DR. HOW'S PATENT TOOTH-CROWNS

AND APPLIANCES FOR MOUNTING THEM.

FOUR-PIN CROWNS.

(Patented April 10, 1883.)



For description of Nos. 1 to 10, see DENTAL COSMOS, April, 1883.

No. 11 is a pair of Crown Pliers, curved, for binding the pins over a post in a lower root.

No. 12 is a carrier with which amalgam, gutta-percha, cement, or other filling-material may be held close to the cavity, permitting the easy use of the packing instruments. The cup is of soft rubber, the handle being attached as shown in the side cut. The surplus material is readily removed from the cup by pressing the sides together at the conclusion of the operation, as in clearing the rubber plaster bowl.

The Four-Pin or "How" Crowns are now in stock, centrals, laterals, and cuspids; for bicuspids the cuspids are in all cases to be used, contouring the backing to form the inner cusp.

A Complete Set of the How Appliances consists of one No. 1, one No. 2, two No. 3, two No. 4 (A and B), two No. 5, two No. 6 (A and B), four No. 7 (two A's and two B's), two No. 8 (A and B), one No. 9 (A and B), one No. 10, one No. 11, and one No. 12.

A Limited Set, for testing the method, consists of one each of Nos. 1, 2, 3, 4B, 5, 6B, 7B, 8B, 9, 10, and a suitable selected Four-Pin Crown. With this limited set, the method may be practiced in a large class of cases; but many roots will require the smaller sizes (A) of Posts and Appliances, which can be ordered by number as occasion demands.

A Trial Set consists of Nos. 4, 5, 6, 7, 9, and a Four-Pin Crown. When the trial set only is purchased, the post must be screwed into the root with a pair of common pliers, though these will mar the threads in turning and bending the post. They will also serve to bend the pins over the mandrel. This *trial* suggestion is made to meet the wishes of some who desire to try first the fewest parts that may be made to answer for accomplishing an experimental working of the method.

If the operator has not a pair of excising forceps, he should add them to his order, as of great use in preparing the root, and in cutting off the post after it is fixed in the root and found too long for proper occlusion, or for fitting the crown. We make for this purpose a curved excising forceps, similar to our No. 31, but with narrow beaks. Price, in Plain Line, $2.50; or in Best Quality, $3.00.

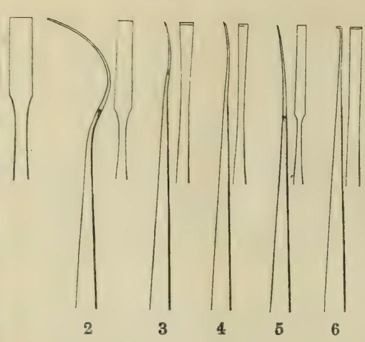
PRICES.

Complete Set	$12.25
Limited "	6.50
Trial "	2.55
Morocco Case, lined with Cotton Velvet, with a separate space for each appliance, and a division for extra Posts and Crowns	4.00

PARTS SEPARATELY.

No. 1.	Spring-tempered Canal Plugger	each	$ .23
No. 2.	Gates Drill	"	.25
No. 3.	Flexible Gauge, for Plugger or Gates Drill . . .	"	.50
No. 4.	Twist Drill; two sizes, A and B	"	.15
No. 5.	Drill Chuck, for Twist Drill or Screw Tap . . .	"	.50
No. 6.	Screw Tap; two sizes, A and B	"	.50
No. 7.	Screw Post; two sizes, A and B	"	.25
No. 8.	Screw Post Chuck; two sizes, A and B	"	1.50
No. 9.	Crown Mandrel, with two sizes of shanks, A and B . .	"	1.00
No. 10.	Crown Pliers, straight	"	1.50
No. 11.	Crown Pliers, curved	"	1.75
No. 12.	Holder for Filling-Materials	"	.40
The Rubber Cup of same, if separate		"	.15
The Four-Pin Tooth-Crowns		"	.15

DR. GEO. H. CUSHING'S SCALERS.



The forms and general character of these Scalers are well shown. All the instruments except No. 6 are intended to be used with the push stroke.

Nos. 1 and 2 are specially intended for application to the posterior surfaces of lower incisors; they are also admirably adapted for removing calculous deposits below the gum between molars and bicuspids, and from the posterior surfaces of the last molars. No. 2 can be passed quite to the extremity of most roots, with less disturbance to the soft tissues than a thicker or more rigid instrument would cause.

Nos. 3 and 4 are for removing deposits at and below the gum between the teeth, particularly the lower front teeth. They can also be easily used upon the sides of the roots of many teeth, being passed toward the apex of the root, in a line nearly or quite parallel with that of the axis.

No. 5 is intended to be passed between the lower front teeth at or near the gum and then directly upward, to remove the deposits on the approximal surfaces.

No. 6 is a hoe, and is intended to be passed quite to the apex of the roots where a hoe is desired.

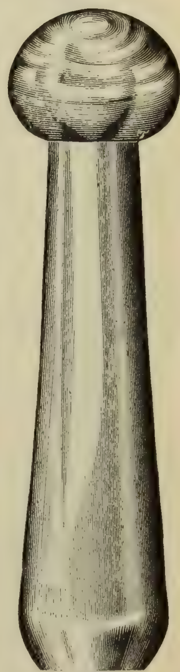
Dr. Cushing says of these Scalers: "Many persons who have been accustomed to use rigid scalers may think the slenderness and flexibility of these instruments an objection; but the practical experience of a number of gentlemen who have learned to use them warrants the belief that very many will find these better adapted for the purposes intendad than the more rigid scalers in general use."

Made in the best manner, special care being given to the tempering; fine blued handles.

Price, per set of six $3.60

GLASS MORTARS AND PESTLES.

No. 1.



No. 2.

No. 3.

No. 1. Made of flint-glass, with ground inner surface. The Pestle has a wooden handle firmly attached.

Price . . . 75 cents.

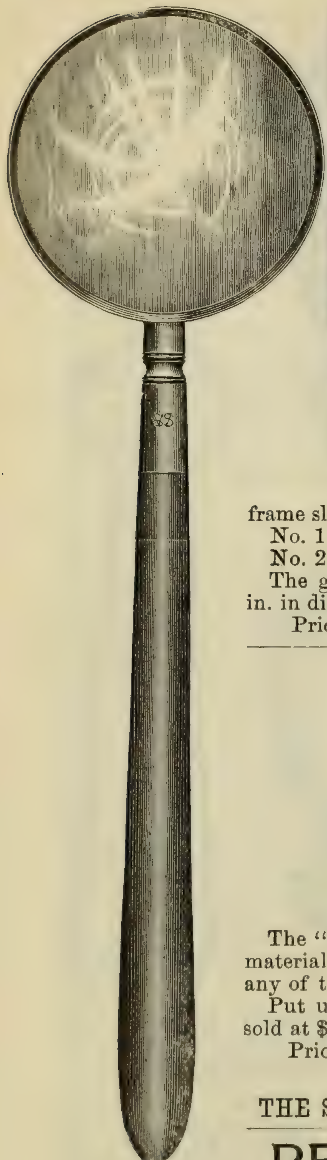
No. 2. Made of flint-glass. This Mortar was made under the personal supervision of Dr. J. Foster Flagg, and through him placed in our hands for sale. The all-glass Pestles can be used on either end.

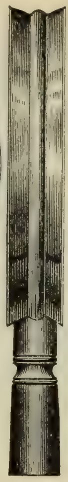
Price . . . 75 cents.

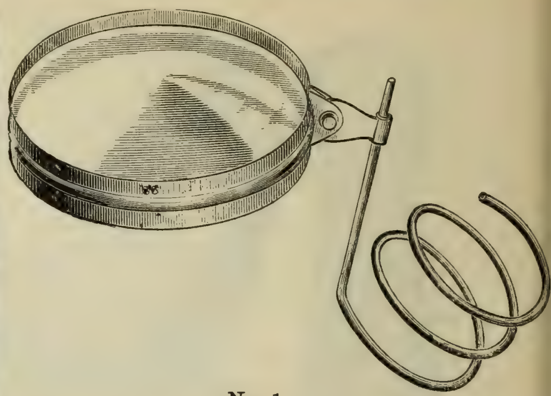
No. 3. Made of opaque glass. Very desirable for mixing small quantities of amalgam.

Price . . . 25 cents.

MAGNIFYING EXAMINING GLASS.







No. 1.

These Glasses have been carefully selected as to focal distance, and are protected from liability of being scratched by a metallic rim or frame slightly raised above the surfaces of the glass.

No. 1 is our old form with spiral to slip over the finger.

No. 2 is mounted on an ebony handle.

The glass is $1\frac{1}{2}$ in. in diameter. A smaller size is made ($1\frac{1}{4}$ in. in diameter) which is designated as No. 3.

Prices uniform . . . . . . each $1.50

DR. FLAGG'S

PLASTIC ENAMEL

NITRO-PHOSPHATE OF ZINC.

The "Plastic Enamel" is not offered as an *insoluble* filling-material, but as one *not readily soluble* and much superior to any of the oxychlorides or oxyphosphates of zinc.

Put up in packages containing twice the quantity formerly sold at $1.00.

Price $2.00

TRADE SUPPLIED BY

THE S. S. WHITE DENTAL MANUFACTURING CO.

No. 2.

PEIRCE'S AMALGAM.

This Amalgam was first made by Prof. C. N. Peirce for use in his own practice, and has become deservedly popular with those who have been for some years constantly using it. Its color, toughness, and edge-strength render it one of the most desirable plastic filling-materials. A piece of "asbestos felt," with directions for its use as a capping for exposed pulps, or as a non-conducting septum, will be inclosed in each package of Amalgam.

Price . . . . per ounce $4.00

Orders received by

THE S. S. WHITE DENTAL MANUFACTURING CO.,

Philadelphia, New York, Boston, Chicago, Brooklyn.

WESTON'S INSOLUBLE CEMENT.

(Classed with the Oxyphosphates.)

The hydraulic properties of this Cement have been demonstrated by careful experiments out of the mouth and in the practice of those most accustomed to its use. In fact, the best results are obtained when the filling, immediately after its introduction into the tooth, is submerged in water as hot as can be borne in the mouth, and this continued from three to five minutes. Approximately the same results are produced by the rapid drying of the filling by hot air,—heat either wet or dry hastening the hardening of the material and securing strength and durability. When used as a capping for exposed pulps, or for attaching porcelain crowns, this Cement may be hardened in two minutes by hot air or hot water, which at the same time prevents all acid reaction. When the hardening is hastened either by the hot-air syringe or by the use of hot water varnishing after filling may be dispensed with.

Put up in half-ounce packages; full directions accompanying each package. Sent by mail on receipt of price.

Price . . . . per package $2.00

PHILADELPHIA, October 15, 1883.

After nearly five years' daily use of Weston's Insoluble Cement, we are fully warranted in the assertion that it does *not* disintegrate or waste away at the cervical edges; that it effectually preserves a class of badly decayed teeth, where gold, amalgam, gutta-percha, and oxychloride of zinc failed, no matter how skillfully inserted. We use it extensively where we formerly used gold or amalgam. Large fillings—crown and approximal—of this Cement, after nearly five years' wear, remain as flush and perfect as when first inserted. Excepting amalgam for small crown and buccal cavities underneath the gum, Weston's Insoluble Cement ranks next to gold. As a plastic filling, in our opinion, it stands without a rival.

This Cement does not deteriorate with age.

T. H. MUSGROVE.
W. R. MILLARD.

Dr. METCALF'S INSOLUBLE ENAMEL

FOR FILLING TEETH.

The steadily increasing demand for this preparation and its excellent reputation are sufficient recommendations, which it is unnecessary to supplement with the quantity of written testimony which we have at hand. To those who have not used this article we would say that it is a pure phosphate of zinc, is non-irritant, insoluble in most mouths, and makes a durable filling. It is extensively used in large cavities as a backing for gold or amalgam, and the rapidity with which it hardens makes it possible to fill over it immediately with gold.

FULL DIRECTIONS ACCOMPANY EACH PACKAGE.

Price, per package $2.00

NEW MINERAL PLOMBE.

George Poulson, the manufacturer of this filling-material, claims that it is not an oxychloride—the ingredients being essentially unlike that class of cements; that it becomes perfectly hard under water; does not dissolve in the strongest vinegar or lactic acid; is unaffected by sulphuric acid; is not itself escharotic or irritant; possesses a hardness superior to any of the oxychloride cements; does not shrink, but adheres closely to the walls of the cavity, and is equally adapted for small or large fillings in either the front or back teeth.

Price . . . . per package $3.00

THE S. S. WHITE DENTAL MANUFACTURING CO.,
Sole Agent for the United States.

We have also in stock

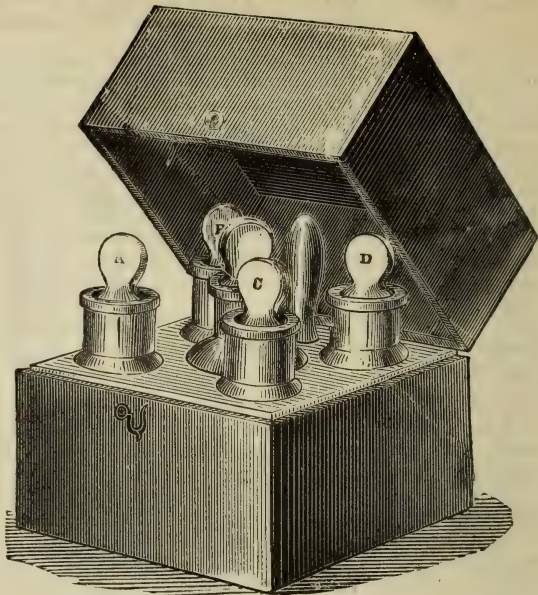
POULSON'S CEMENT.

Put up in 1-oz. boxes.

Price . . . . per box $3.00

SMITH'S OXYCHLORIDE OF ZINC.

This preparation was among the earliest of the oxychlorides, and its sale has been continuous, while many preparations which were put upon the market to take its place or lessen its popularity have passed out of existence.



Put up in three forms, as follows:

In quarter-ounce Glass-stoppered Bottles	each	$1.00
In one-ounce, Plain Form	"	1.00
In Morocco-covered Cases, as shown in cut, containing four colors of Powder and one bottle of Liquid	"	4.00

IMPROVED CAPSICUM BAGS.

For securing resolution or suppuration in inflammatory conditions of the pericemental membrane; for relieving congested and irritated pulps after capping, filling, etc.

Prepared in their Modified and Improved Form by WM. C. FOULKS, D.D.S.

Capsicum Bags were first prepared and used by J. Foster Flagg, D.D.S., Professor of Dental Pathology and Therapeutics in the Philadelphia Dental College.

The many and varied stages and conditions of pericemental and pulp-irritation, which are usually successfully met by the prompt and judicious application of Pepper Bags, range from tenderness, which is often induced by the insertion of a gold filling, to that active inflammation known as fourth-grade periodontitis.

The use of these bags may be generally considered from two stand-points, viz.;

1st.—For persistent, gentle, and sufficient stimulation to effect resolution.

2d.—For persistent and sufficiently decided stimulation to produce suppuration.

No dentist having once used Pepper Bags would be without them. General directions will be found in each box. For special information in regard to the use of Pepper Bags, reference may be had to "Quiz Questions on Dental Pathology and Therapeutics," J. Foster Flagg, D.D.S., page 116.

Put up in boxes containing one dozen bags.

Price, per box $1.00

Compound Bags, containing Chlorate of Potassium, Hamamelis, and Tannic Acid.

In all cases where the stimulation of Capsicum Bags increases or fails to diminish pain and tenderness,—except where abscess is desired,—the prompt and continued use of Compound Bags—in view of their persistent soothing, cooling, and astringent effect—is indicated.

Put up in boxes containing one dozen bags.

Price, per box $1.00

SET OF CARVING TOOLS

Designed by DR. W. W. EVANS.

This set of three double-end tools was arranged originally for use in the preparation of wax models for celluloid-work, but they will be found well adapted for all carving purposes where fine work is required, as in wax, clay, or unbaked porcelain.

Nos. 1 and 2 have steel points, at one end of each a carver similar to Dr. Kingley's well-known vulcanite finishers; at the other end is a knife-blade, that of No. 1 being curved, while No. 2 is straight.

The points of No. 3 are ivory, having a wide range of usefulness as burnishers and wax spatulas, especially in working the wax into the interstices to form the festoons of the gum.

PRICES.

Nos. 1 and 2, with Apple-Wood Handles	each $1.25
No. 3, with Apple-Wood Handle	1.50
Nos. 1 and 2, with Ebony Handles	each 1.50
No. 3, with Ebony Handle .	1.75

BABBITT-METAL
FOR DIES.

Dr. L. P. Haskell, of Chicago, says, in a paper read before the Illinois State Dental Society:

"One reason why so many dentists dislike metal work is on account of the difficulty they have in using zinc, and it is about time it was banished from all laboratories. Babbitt-metal is the only metal suitable for dental dies, as it has all the qualities desired; but remember that it must be a genuine article, as most of that which is sold is inferior."

We have prepared a lot of Babbitt-metal of the best quality, in accordance with the formula approved by Dr. Haskell.

Price . . . . per pound 45 cents.

PRESENT PRICES

OF

NITROUS OXIDE GAS.

With the reduction in the prices of nitrous oxide advertised in the January (1883) Dental Cosmos, we announced that we should thereafter abandon the practice of paying freight or expressage on either full or empty cylinders, a custom which has been on occasions a source of annoyance and misunderstanding. Previous to that time we had paid freight on cylinders one way, at an average cost of about 50 cents on 100-gallon cylinders, and $1.00 on 500-gallon cylinders. The reduction amounts to an average saving to the consumer of over 50 cents on each 100-gallon cylinder, and about $1.50 on each 500-gallon cylinder.

We take this opportunity of calling attention to the absolute chemical purity of the gas manufactured by us. The improved processes by which it is made at both our laboratories (Philadelphia and Staten Island), give to the operator certainty and security in the use of the gas. We guarantee every cylinder to contain the full quantity of gas as stated on the label. Each customer can test this for himself by weighing the cylinder when full, and again when empty.

Our rule with regard to leakage is printed on the tag which accompanies each cylinder, and is as follows: "Weigh this cylinder *as soon as received.* If the weight does not agree with that on the label, return the cylinder *at once.* Otherwise no allowance can be made for shortage." It will thus be seen that we guarantee the cylinder to contain the full quantity of gas charged, not only when it leaves us, but when it reaches the customer. If the valve is tight while the cylinder is in our possession, and during its transit to the customer, it is satisfactory evidence that it is in good condition, and no allowance will be made for subsequent leakage. The valves which we now furnish are proving highly satisfactory, and complaints of loss by leakage have been reduced to a minimum.

We are manufacturing more gas than ever before, but our improved facilities enable us to fill all orders promptly.

Price, in 100-Gallon Cylinders, per Gallon, 5 Cents.
" " 500- " " " " 4 "

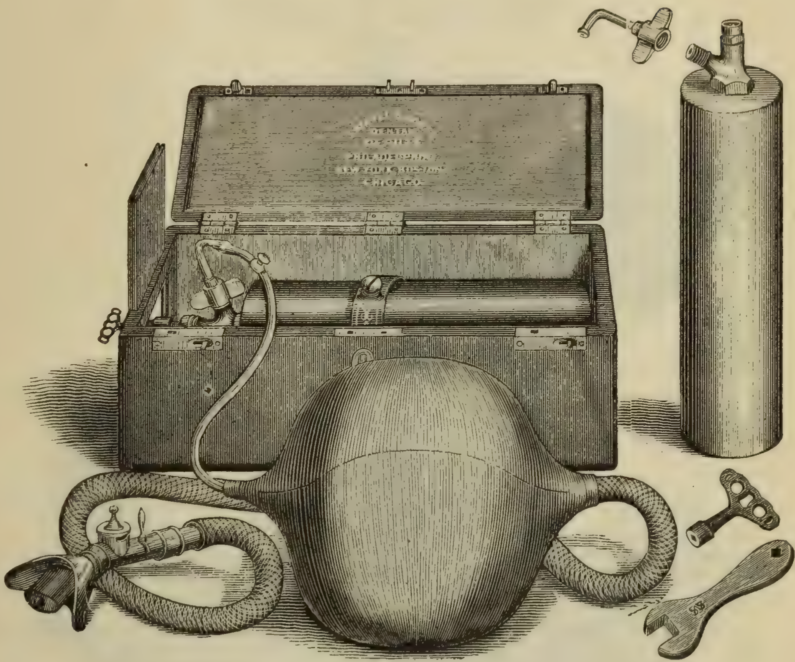
Prices of Gas Apparatus and parts have also been reduced.

THE S. S. WHITE DENTAL MANUFACTURING CO.,

PHILADELPHIA, NEW YORK, BOSTON, CHICAGO, BROOKLYN.

SURGEON'S CASE,

Nos. 1 and 2.



The complete apparatus is shown in cut, and consists of an iron cylinder containing at least 100 gallons (usually more) of nitrous oxide, liquefied, to which is attached the necessary tubing, with gas-bag and inhaler; the whole inclosed in a stout morocco case lined with velvet.

In manufacturing the Surgeon's Case particular attention has been given to each and every part, so as to insure not only a complete but the very best apparatus of its kind.

The Case is made of well-seasoned wood, is lined with velvet, and covered with morocco, and the hinges, locks, and bolts are nickel-plated. A stout cast-steel ring, neatly japanned, with a heavy set-screw, clamps the cylinder.

The No. 1 Case has a 4½-gallon bag, and the No. 2 case has a 7-gallon bag.

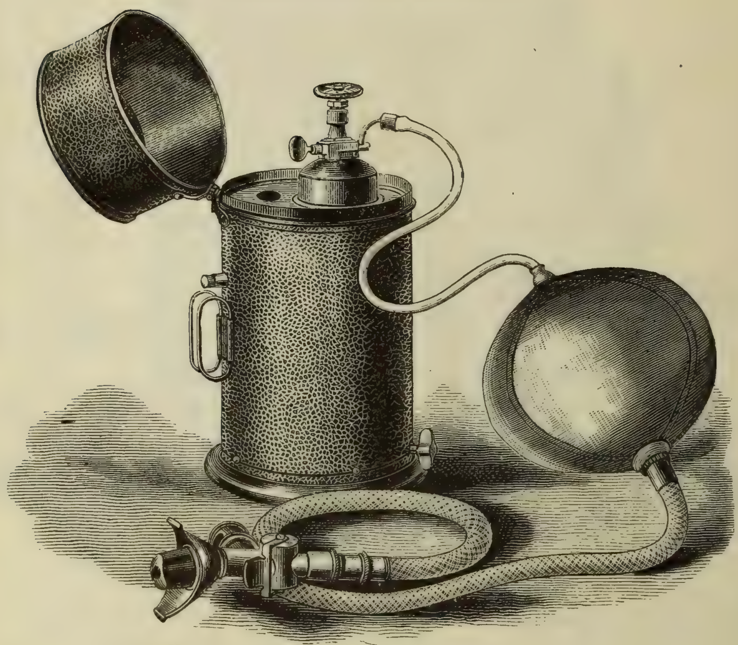
PRICES.

No. 1 Case, Complete, with Filled Cylinder	$40.00
" 2 " " " "	42.00

For parts separately, see page 27.

UPRIGHT
SURGEON'S CASE,
Nos. 3, 4, 5, and 6.

Patented March 25, 1879.



In this form of Case the cylinder stands on end, which is reckoned by some operators an advantage in permitting a free flow of gas, but we have had no complaints of the original form as shown in Cases Nos. 1 and 2. To meet all demands we offer the two forms.

No. 3, Complete Apparatus, with 4½-gallon Bag in stout Tin Case, covered with Leather	$40.00
No. 4, the same, but with 7-gallon Bag	42.00
No. 5, Complete Apparatus, with 4½-gallon Bag in stout Tin Case, handsomely Japanned	34.00
No. 6, the same, but with 7-gallon Bag	36.00

For parts separately, see page 27.

STAND

FOR GAS CYLINDERS.

Invention of Dr. W. H. Downs.

A simple and convenient device for holding gas cylinders, specially designed for use in the operating-room of the resident dentist.

It consists of an iron base with a tin casing in which the cylinder is placed and securely held by a set-screw.

Japanned and ornamented.

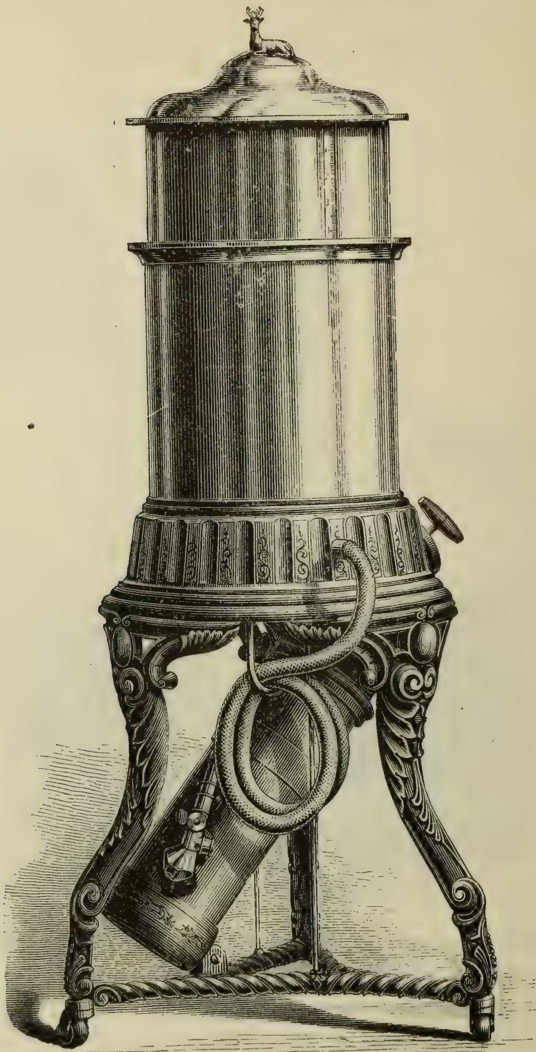
PRICES.

Stand for 100-gallon Cylinder	$4.50
" " 500- " "	7.00

For parts separately, see page 27.

GASOMETER AND ORNAMENTAL STAND.

(SEE OPPOSITE PAGE.)



Nickel-plated Gasometer and Stand	$128.00
" " " complete, with 500-gallon Cylinder (filled), Tubing, Inhaler, etc.	160.00
Japanned Gasometer and Stand	90.00
" " " complete, with 500-gallon Cylinder (filled), Tubing, Inhaler' etc.	140.00
Boxing	5.00

The prices of complete apparatuses vary slightly, as the gas, whether more or less than 500 gallons, is charged at 4 cents per gallon.

For parts separately, see page 27.

NICKEL-PLATED GASOMETER.

(SEE OPPOSITE PAGE.)

Designed for those who use large quantities of Nitrous Oxide, or who may desire a highly ornamental piece of office furniture, coupled with a *really economical* gas apparatus.

The cut represents the nickel-plated Gasometer, mounted on a stand, with a 500-gallon cylinder in position

The Gasometer will hold 10 gallons of gas—sufficient to completely anesthetize any patient. The usual quantity of gas given to a patient is from 3 to 5 gallons.

If it is desirable to keep the patient under the influence of the anesthetic for a prolonged period (as in a surgical operation), the operator has under his control 500 gallons of gas, by merely turning the key seen in the cut at the right.

On the bell of the Gasometer there is a scale graduated in gallons and fractions of a gallon, so that the operator can readily see how much gas he has administered.

Another valuable feature of this Gasometer is a peculiar water-check or valve, so arranged that though the gas flows freely on the slightest inspiration at the inhaler, it is instantly and automatically shut off by the water when the patient stops breathing. This prevents all waste of gas; it also saves the dentist's time at the most critical moment, as he has only, after having administered the gas, to lay aside the inhaler and proceed at once to operate, without the necessity of shutting any stop-cock. The stand is so constructed that a small (100-gallon) cylinder can be used while the larger cylinder is being refilled.

We also call attention to the fact that there is no liability to loss of gas from leakage, caused by the operator's leaving the valve of the cylinder open, for if there is such escape from the cylinder the bell of the Gasometer will rise, and the operator will have his attention called to the waste, thus enabling him to correct the difficulty at once.

The gas can be kept for any length of time, and is constantly on hand *and always of the best quality.*

PRICES OF PARTS OF SURGEON'S CASES WHEN SOLD SEPARATELY.

Cylinder, with 100 gallons of Gas	$15.00
" " 500 " "	42.00
Refilling 100-gallon Cylinder	5.00
" 500- " 4 cents per gallon . . . . say	20.00
Morocco Case, Velvet-lined, with Nickel-plated mountings	10.00
Upright " Leather-covered " "	10.00
" " Japanned, " "	5.00
Gas-bag, 4½-gallons' capacity	2.50
" 7- "	4.00
Metallic Connections for Gas-bags, per set	.50
Inhaler, Nickel-plated	9.50
Inhaling Tubing, Worsted, 4 feet, @ 50 cents per foot	2.00
Wheel Key	.25
Yoke, Nickel-plated, with Tube for connecting Cylinder and Bag	1.50
Union for Shaw Valve, Nickel-plated	1.50
Wrench " " "	.50
Stop-cock, for insertion in small Rubber-Tubing	1.00

TOOTH POWDERS.

WE OFFER

FIVE VARIETIES OF POWDERS,

DESIGNATED RESPECTIVELY

No. 1, No. 2, No. 3, Soluble, and Phenated.

No. 1 Tooth Powder.

Two Flavors—ROSE and WINTERGREEN.

An Elegant, Pleasant, and Efficient Dentifrice, highly recommended as a Toilet Article for both old and young.

THIS powder has been known to the dental profession and to the public for a quarter of a century. It has had an immense sale, and has received general and hearty indorsement. It is intended to meet all the requirements of a dentifrice for general use, combining elegance as a toilet article with efficiency, and it may be used with pleasure and benefit at all ages. It is highly perfumed with delicate oils, and is in every respect as perfect as we know how to make it.

In ordering, state the flavor desired,—Rose or Wintergreen (Teaberry).

Price, 4-lb. tin cans	each	$5.00
" 1-lb. " "	"	1.50
" ½-lb. " "	"	.90
" ¼-lb. " "	"	.50

No. 2 Tooth Powder.

As an efficient and wholesome dentifrice, all that we have affirmed of our No 1 Powder is equally true of the No. 2. For real value as a cleansing powder for daily use it is equal to the best, but is less elegantly colored, and less delicately perfumed. Like the No. 1, however, it may be used with entire confidence by children and adults.

Price, 4-lb. tin cans	each	$3.50
" 1-lb. " "	"	1.00
" ½-lb. " "	"	.60
" ¼-lb. " "	"	.35

No. 3 Tooth Powder.

Our No. 3 Tooth Powder, though designed more for real efficiency than for elegance, is nevertheless an agreeable and excellent preparation. It is composed of pure materials, and meets all the requirements of cleanliness. The difference between it and the higher-priced powders is in color, odor, and taste,—not in essential qualities.

Price, 4-lb. tin cans	each	$2.50
" 1-lb. " "	"	.75
" ½-lb. " "	"	.45
" ¼-lb. " "	"	.25

Soluble Tooth Powder.

This powder has been prepared with special reference to the wishes of those who desire a moderately abrasive dentifrice without other medical property than that included in an antacid quality. It possesses the hardness necessary for removing recent and slight deposits upon the teeth; is grateful to the taste, and leaves no unpleasant after-impression of astringency. For this reason it is preferred by many. Children are apt to esteem it above the other powders, because it is free from the resinous after-taste which makes a dentifrice acceptable to older persons.

Price, 4-lb. tin cans	each	$5.00
" 1-lb. " "	"	1.50
" ½-lb. " "	"	.90
" ¼-lb. " "	"	.50

Phenated Tooth Powder.

This powder is designed to combine the ordinary abrasive and antacid qualities of a dentifrice with disinfecting and deodorizing properties. It is recommended in those cases where the condition of the teeth or gums causes an offensive breath, and in scorbutic and aphthous conditions of the mouth. It is pleasant to the taste, cooling to the gums, sufficiently abrasive for cleansing the teeth, and is altogether unexceptionable as a daily toilet article.

Price, 4-lb. tin cans	each	$5.00
" 1-lb. " "	"	1.50
" ½-lb. " "	"	.90
" ¼-lb. " "	"	.50

MOUTH WASHES.

Oralina.

This is an agreeable preparation, intended for daily use as a toilet article for cleansing the mouth and teeth and imparting a pleasant fragrance to the breath. It is slightly stimulant, astringent, and antacid, though not to an extent which would make it objectionable. It is not, therefore, recommended as possessing medicinal qualities adapting it to diseased conditions of the mouth or gums, but simply as a wholesome detergent for general use. It may be used freely on the brush or diluted with water as a mouth wash. It is warranted to contain nothing injurious to the teeth.

Put up in neat and showy 4-oz. glass bottles, with metallic tops, illustrated in accompanying cut.

Price . .	per gross	$41.00
" . .	per dozen	4.00
" . .	per bottle	.40

Saponaceous Toilet Mouth Wash.

A detergent, antacid preparation containing a large proportion of castile-soap and intended for daily use in cleansing the mouth and teeth. Used upon the brush a drop or two is sufficient.

Put up in neat 4-oz. Panel-arch Bottles.

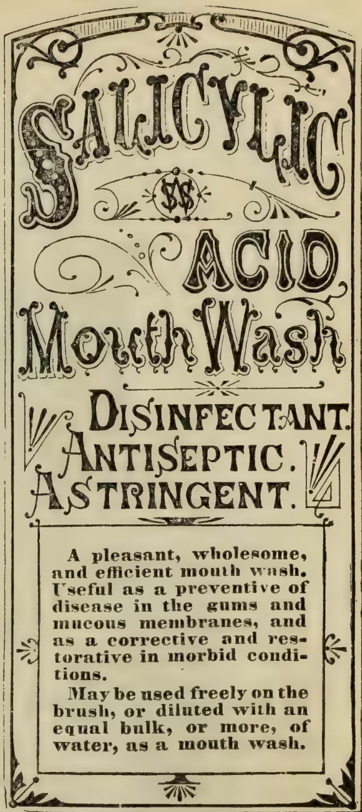
Price	per gross	$38.00
"	per dozen	3.75
"	per bottle	.40

Salicylic Acid Mouth Wash.

Salicylic acid possesses remarkable properties as a disinfectant and deodorizer. Being without smell or taste, it advantageously replaces carbolic acid, to which in the respects alluded to it is highly preferable. It has been employed successfully in the form of mouth wash or gargle in stomatitis, and in scorbutic or aphthous conditions of the mouth and gums, and is believed to be very efficacious in the destruction of oral parasites, and generally efficient in the treatment of morbid conditions of the gums and mucous membrane. This mouth wash contains salicylic acid in full proportion according to an approved formula.

Put up in 6-oz. square white glass bottles with metallic tops, bearing a fac-simile of the label herewith illustrated.

Price . . .	per gross	$66.00
" . . .	per dozen	6.50
" . . .	per bottle	.75



Astringent Mouth Wash.

An agreeable and useful wash, combining anodyne, astringent, disinfectant, detergent, tonic, and styptic properties.

Put up in 3-oz. Bottles.

Price	per gross	$38.00
"	per dozen	3.75
"	per bottle	.40

Put up in 16-oz. Bottles.

Price	per bottle	$1.25

Teaberry (Wintergreen) Mouth Wash.

A detergent and stimulant wash, the teaberry flavor predominating.

Put up in neat 2-oz. Bottles.

Price	per gross	$23.00
"	per dozen	2.25
"	per bottle	.25

Bouquet Mouth Wash.

We consider the Bouquet Mouth Wash to be the most elegant and delightful toilet wash of which we have knowledge. It is intended for daily use by those whose mouths are in a healthy condition and needing no special medication. It is highly perfumed, destitute of astringency or bitterness, grateful to the taste, and and leaves a persistent fragrant perfume upon the breath.

Put up in 6-oz. Panel-arch Bottles, Glass-stoppered.

Price	per gross	$92.00
"	per dozen	9.00
"	per bottle	1.00

FLORENTINE MOUTH WASH.

Attention is invited to this very desirable mouth wash, recently put upon the market by us.

We have endeavored to furnish in this preparation a wash which should as nearly as possible combine all the qualities desirable in a mouth wash for daily family use—adapted to the average taste of old and young—and which can be employed by all with pleasure and advantage. It has a slight pungent, aromatic flavor, a very mild astringency, and leaves a grateful sense of stimulation to the gums and mucous membrane.

Put up in 3½-oz. panel-arch bottles, with metal sprinkler-tops.

Price .	per ½-gross	$20.40
" .	per ¼-gross	10.80
" .	per dozen	4.00
" .	per bottle	.40

Aromatic Mouth Wash.

An agreeable and efficient aromatic preparation, as a wash for toilet use, where moderate astringency and stimulation are desired.

Put up in neat 4-oz. panel-arch bottles.

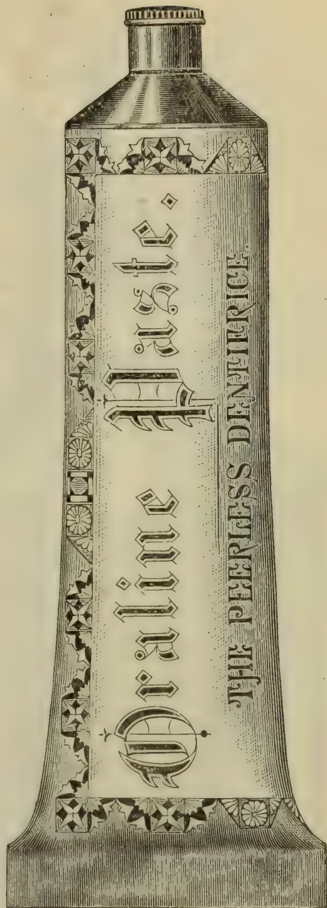
Price . .	per gross	$61.00
" . .	per dozen	6.00
" . .	per bottle	.75

Tonic Mouth Wash.

A stimulant and slightly astringent wash. Put up in neat 2-oz. bottles.

Price	per gross	$23.00
"	per dozen	2.25
"	per bottle	.25

ORALINE PASTE.



We invite attention to this preparation as the most satisfactory dentifrice that has been put upon the American market, its qualities commending it to all who have tried it. It combines real efficiency as an abrasive, detergent, and antacid, with elegance as a toilet article. It imparts a delightful and persistent fragrance to the breath and a sense of cleanliness to the mouth. In these respects it is superior to any other article we have tested. It is composed of pure ingredients, and is guaranteed to contain nothing capable of acting injuriously on tooth-substance.

Put up in tubes as shown in the cut, making it convenient for use; each tube inclosed in a neat box.

Price . . .	per ½-gross	$20.40
" . . .	per ¼-gross	10.80
" . . .	per dozen	4.00
"	each	.40

TOOTH SOAPS.

[THREE FLAVORS.]

A properly-made tooth soap is a very agreeable aid to the toilet, and by those who know how to use it is preferred to any other dentifrice. Rubbing the wet brush upon the cake is not the proper way to get a supply for cleansing the teeth, because the repeated contact with the water will soften the soap, and develop objectionable features. The better way is to scrape off a little and use this on the brush. The sweetness and fragrance of the dentifrice are thus preserved to the last.

Our tooth soap is composed of the purest white soap, cocoanut oil, English precipitated chalk, orris root, white sugar, and aromatics, warranted of the best quality. These are so skillfully combined that, while the resulting dentifrice has all the cleansing properties of the best soaps, the peculiar soapy taste is completely masked. We have three flavors:

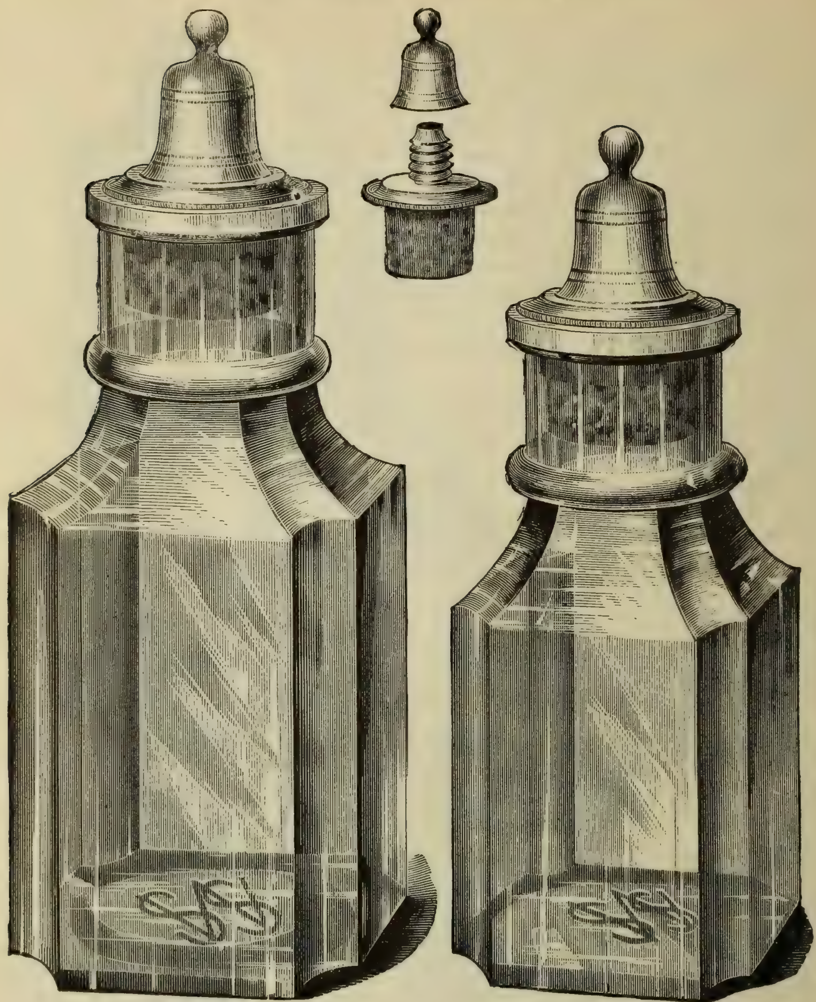
MINT, WINTERGREEN, ROSE,

experience having demonstrated that these leave the most agreeable taste in the mouth after use.

Put up in cakes 2½ inches long, 1⅝ inches wide, and ⅝-inch thick, and inclosed in a neat box. Each cake as a guarantee of quality is stamped with the name "S. S. White."

	Per gross.	Per dozen.	Per cake.
Price, Mint or Wintergreen .	$21.00	$2.00	25 cents.
" Rose	27.00	2.50	30 "

TOOTH POWDER BOTTLES.



No. 1, Large. No. 2, Small.

These bottles are made of flint-glass. The mouths being wide permits their being easily filled, the tapering necks allowing the powder to flow readily, without choking up, as is the case with most other patterns now in the market.

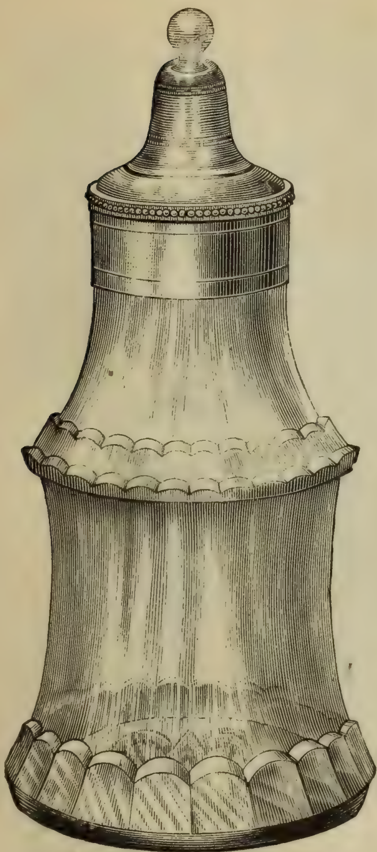
The tightly-fitting corks with screw tops are advantages which are fully explained by the cuts. The cut showing the construction of the cap is half actual size; bottles full size.

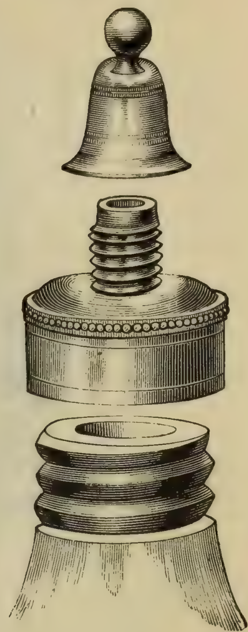
This convenient manner of keeping tooth powder meets with general favor, avoiding waste, and the bottle can be readily carried when traveling. The fragrance of the powder is retained, and several may use from the same bottle with propriety.

	Per gross.	Per ½-gross.	Per dozen.	Each.
No. 1 (Large)	$14.50	$7.75	$1.50	$0.15
" 2 (Small)	12.00	6.50	1.25	.12
" 1, Filled with our No. 1 Tooth Powder	43.00	23.00	4.50	.40
" 2, " " " "	31.00	16.50	3.25	.30

NOTE.—These bottles can also be supplied, *on order*, with the same cap, adapted for mouth washes, at same rates as above.

TOOTH POWDER BOTTLE, No. 3.





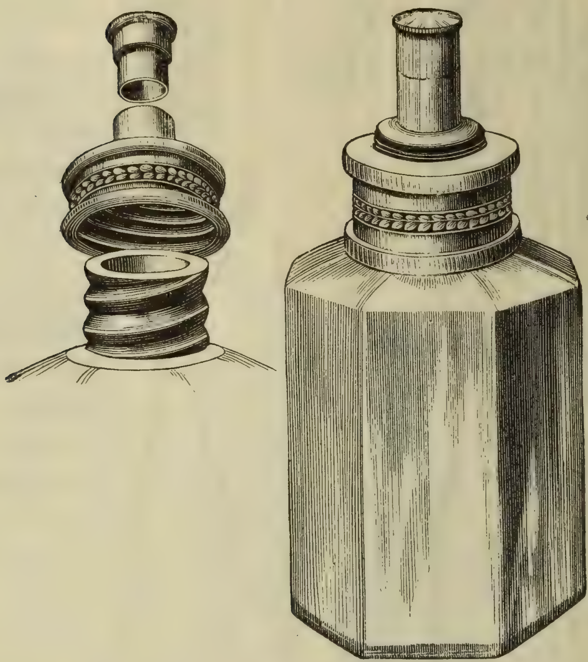
Made of flint-glass. The tops are screwed on the necks of the bottles. The cuts show the full size.

	Per gross.	Per ½-gross.	Per dozen.	Each.
With Plain Top	$14.50	$7.75	$1.50	$0.15
" Finely Nickel-plated Top .	21.50	11.50	2.25	.20
" Plain Top, filled with our No. 1 Tooth Powder .	31.00	16.50	3.25	.30
" Finely Nickel-plated Top, filled with our No. 1 Tooth Powder . . .	38.50	20.50	4.00	.35

NOTE.—This bottle can also be supplied, *on order*, with the same cap, adapted for mouth washes, at same rates as above. A neat and convenient bottle for either powder or liquid. When ordering bottles please state whether wanted for liquids or powders.

TOOTH POWDER BOTTLE.

Patented Nov. 19, 1867, by Dr. J. B. Da Camara.



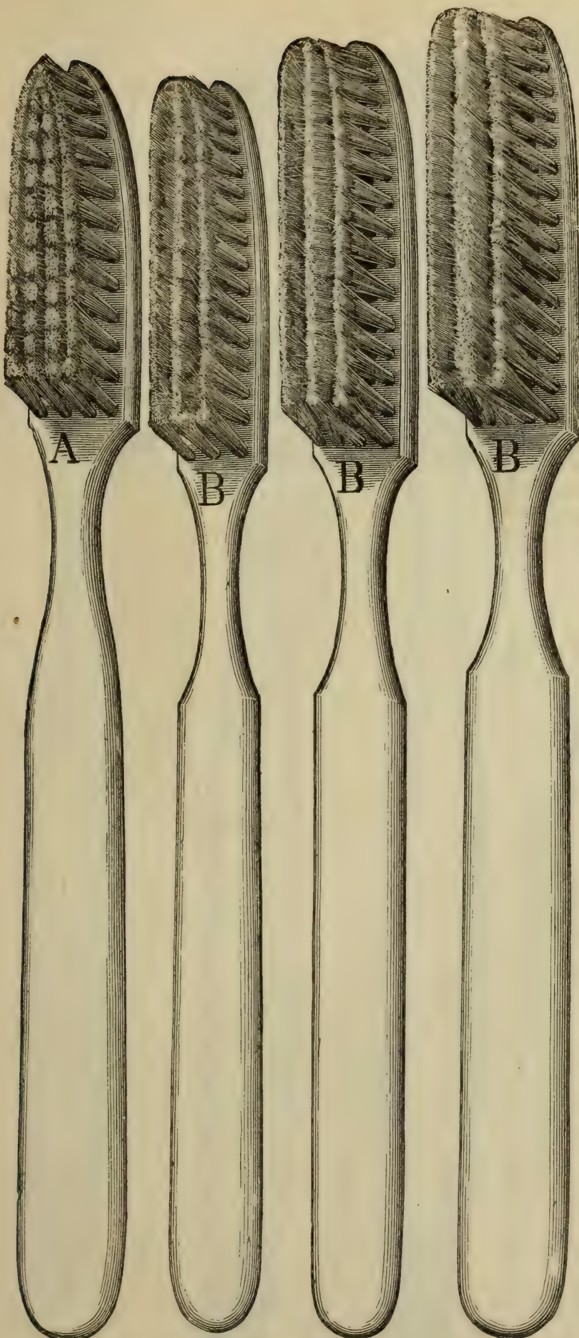
Made of flint-glass. The metallic tops are screwed on the necks of the bottles. Cuts are full size.

PRICES.

	Per gross.	Per half-gross.	Per dozen.	Each.
Bottle and Cap	$14.50	$7.75	$1.50	$0.15
Bottle and Cap, filled with our No. 1 Tooth Powder	26.50	14.00	2.75	.25
Bottle and Cap, each Bottle inclosed in a neat Card-board Box .	19.25	10.25	2.00	.20
Bottle and Cap, each Bottle filled with our No. 1 Tooth Powder, inclosed in a neat Card-board Box .	31.00	16.50	3.25	.35

Dentists and Druggists can affix their own Labels.

TOOTH BRUSHES.



4-Row. 3-Row. 4-Row. 5-Row.

MADE EXPRESSLY FOR OUR SALES.

This style of brush has received the approval of numbers of the most intelligent dentists. The arrangement of the bristles is such as to allow their entrance between the teeth, and into depressions and irregular spaces, thus insuring greater cleanliness than can be secured with a flat-faced brush.

A is pointed, as shown in cut, 4 rows.

B is less pointed, and in three sizes, 3, 4, and 5 rows.

PRICES.

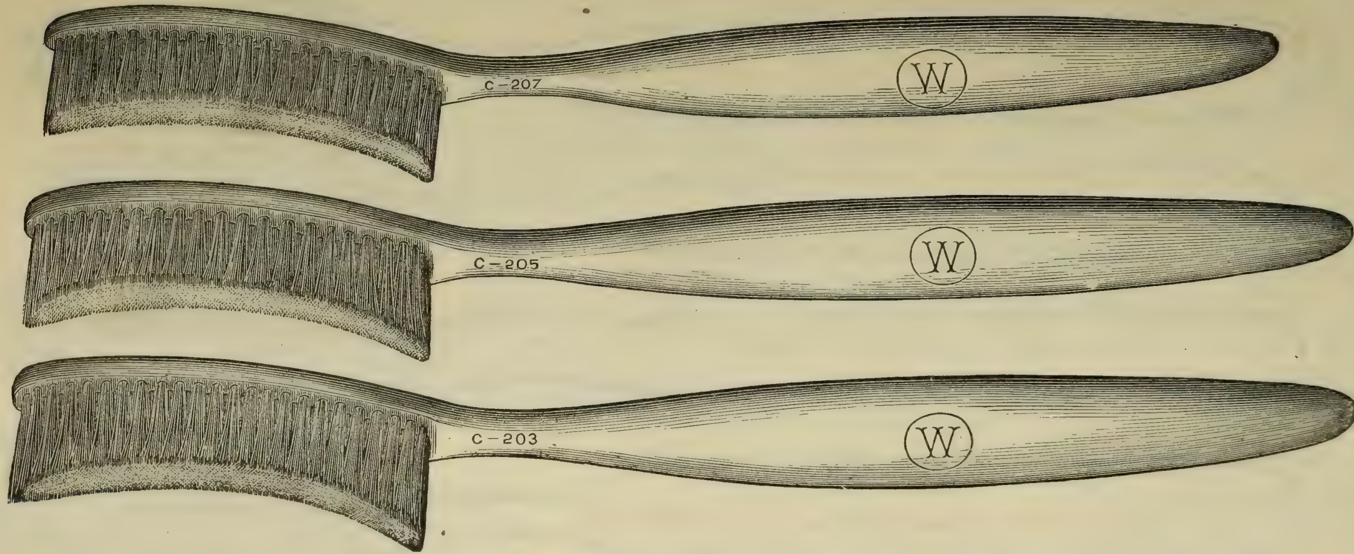
A 4-row,	per doz.		$3.00
B 3	"	"	2.30
B 4	"	"	3.00
B 5	"	"	3.80

We have also a smaller sized brush of the "A" pattern, for children's use. It is made with three rows of bristles, of a soft grade ; the bristle portion is one and a half inches in length.

Price . per doz. $2.30

When six dozen or more brushes are purchased at one time, a discount of 12½ per cent. will be allowed on the prices quoted.

TOOTH BRUSHES.

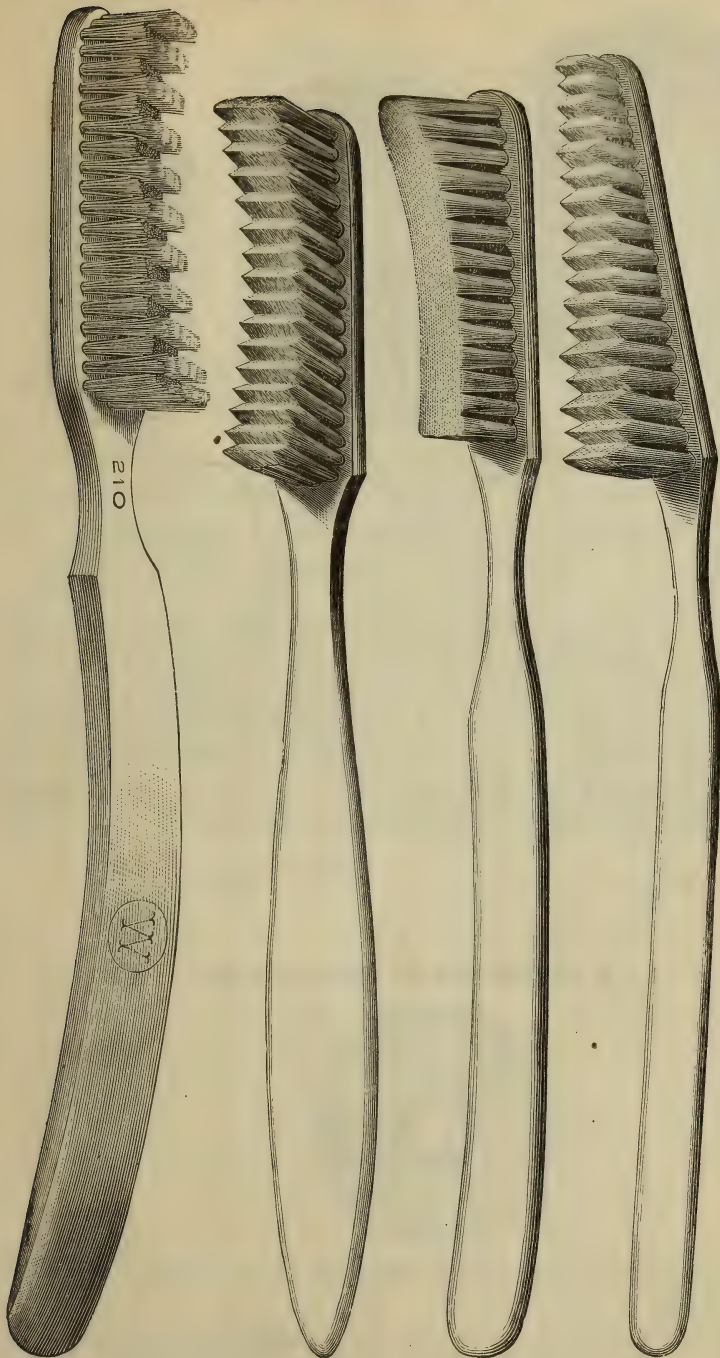


PRICES.

No. 203.	Five Rows, Plain Backs, Hard and Soft Grades	per doz. $3.25
" 205.	Four " Plain " " " " "	" 2.75
" 206.	" " Waxed " " " " "	" 3.25
" 207.	" " Plain " " " " "	" 2.50

When six dozen or more are purchased at one time, a discount of 12½ per cent. will be allowed on above prices.

TOOTH BRUSHES.



210 211 212 213

PRICES.

Nos. 210, 211, 212, and 213 . . . per doz. $3.00 | Same Shapes, in Smaller Sizes, for Children's Use, per doz. $2.50

When six dozen or more of these brushes are bought at one time, a discount of $12\frac{1}{2}$ per cent. will be allowed on the prices quoted.

☞ *In addition to those illustrated, we have a large assortment of American, French, and English Brushes, ranging from $1.32 to $4.30 per dozen.*

DENTAL FLOSS SILK.

TWO VARIETIES.

The two varieties of floss silk which we offer, plain and waxed, are made expressly and solely for our sales, of superior stock, and warranted all silk. We have yet to hear the first complaint as to quality, and we have sold millions oi yards.

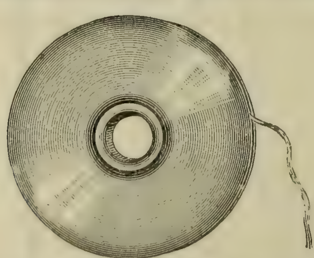
Put up in spools containing twelve yards each. The waxed is inclosed in round boxes to preserve it from dust.

	Per half-gross.	Per dozen.	Per spool.
Price, Plain	$8.00	$1.50	15 cents.
" Waxed	12.00	2.25	20 "

We also supply the waxed in smaller spools, holding six yards each, very convenient for replenishing our floss-silk holder shown below.

	Per half-gross.	Per dozen.	Per spool.
Price, Waxed	$6.75	$1.25	12 cents.

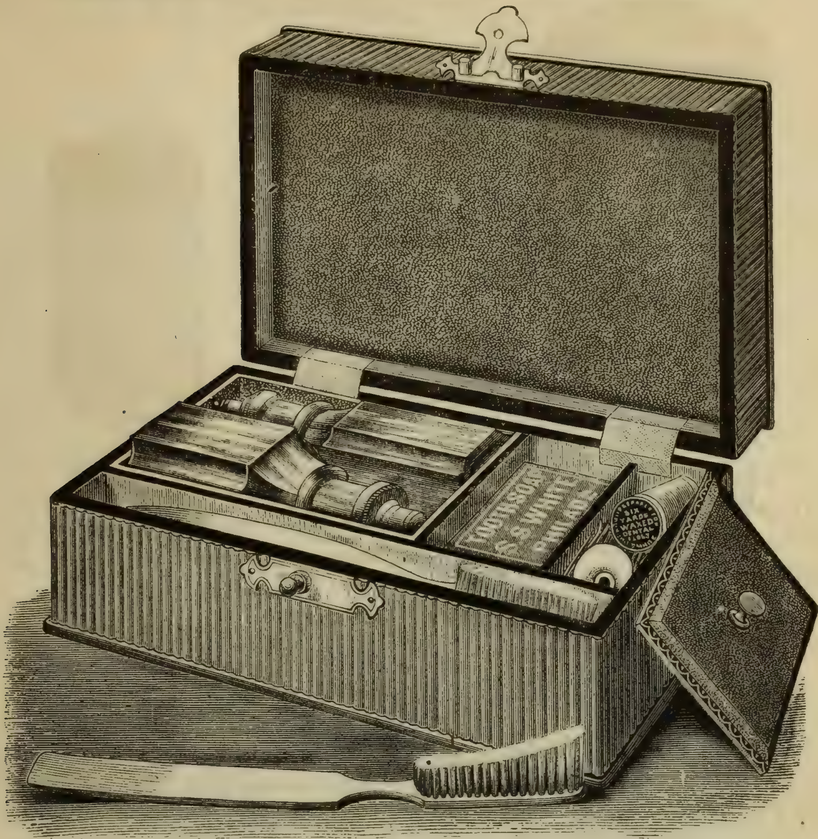
FLOSS-SILK HOLDER.



A holder for the pocket, made of steel, nickel-plated, carrying six yards of waxed floss silk.

Price	per quarter-gross	$7.88
"	per dozen	3.00
"	each	.30

TRAVELER'S DENTAL TOILET CASE.



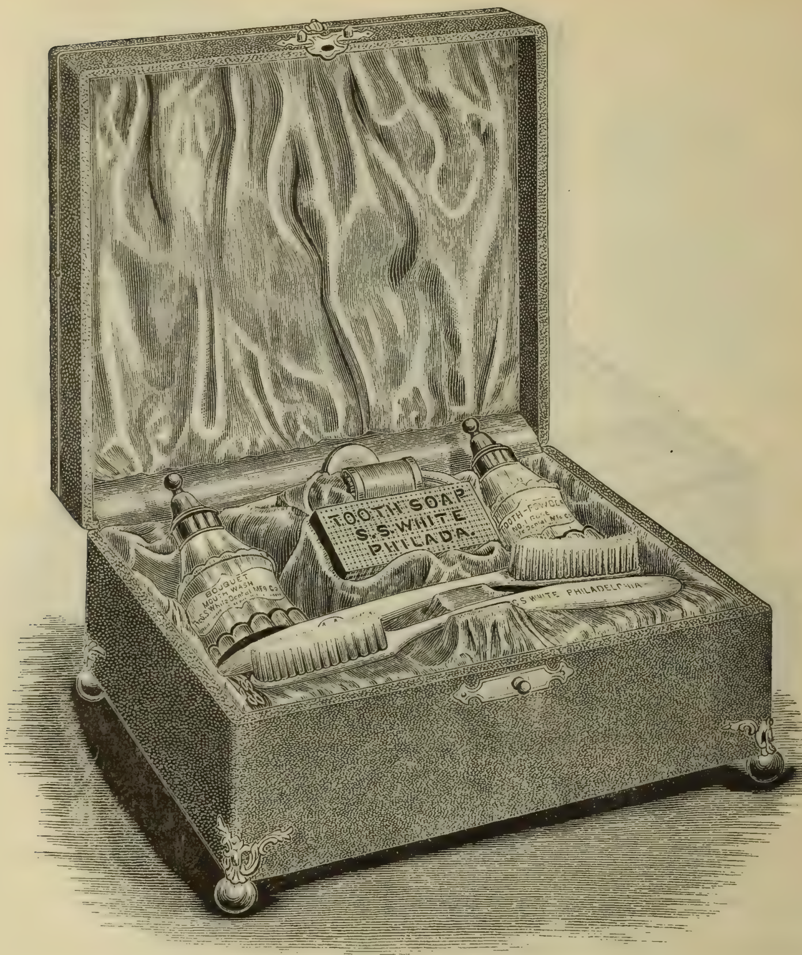
This neat and substantial case is a very useful companion for the traveler, and a convenient accessory to the dressing-bureau. Covered with morocco and lined with silk-finish cotton velvet. The case contains all the necessary dental toilet articles, viz.: tooth powder, mouth wash, tooth soap, tooth brushes, floss silk, floss-silk holder, and tooth picks.

Price	$5.00
To dentists who buy the above to sell to their patients . . .	4.00

COLOGNES.

Ordinary Cologne, pint bottles	each $1.00
Bouquet Cologne, 12-oz. glass-stoppered bottles . .	" 1.50
Oriental Cologne, 12-oz. glass-stoppered bottles . .	" 1.75

BOUDOIR DENTAL TOILET CASE.



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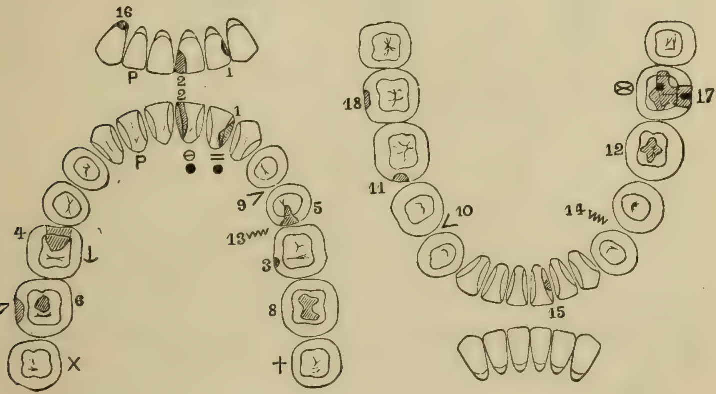

1880.		No. UPON DIAGRAM.	TIME. HOURS.	PRICE.	DR.	CR.
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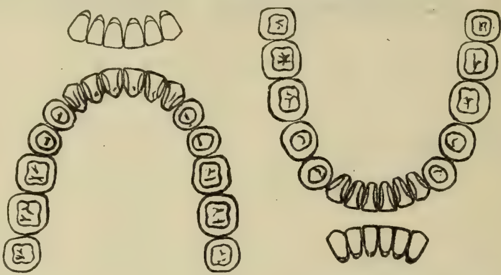

Hour.		No.	Op'n.	Dr.		Cr.	
8							
9							
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11							
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MONDAY. 188

8		1	
9		2	
10		3	
11		4	
12		5	

TUESDAY.

8		1	
9		2	
10		3	
11		4	
12		5	

WEDNESDAY.

8		1	
9		2	
10		3	
11		4	
12		5	

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In addition to the facilites afforded by this institution for a thorough course of instruction in the theory and practice of dentistry, the clinics in the University Hospital enable the Dental equally with the Medical Students to become familiar with the diseases and operations of Practical Surgery; excisions of jaw, partial or entire; tumors, cancerous or benign, of various parts of the buccal cavity; plastic operations for the restoration of cheek, lips, etc., may be mentioned as having been before the class during the year. The induction of anesthesia by means of different agents—ether, chloroform, bromide of ethyl, nitrous oxide gas, all being used in the clinics—cannot fail to be of use to the student of Oral Surgery.

The Lecture Halls in the University Buildings are large and well lighted; and every facility will be afforded for practical and theoretical dental instruction. Demonstrations in Anatomy, Physiology, and Pathology, (for which an abundance of material is furnished **free of charge**), also form an important part of the regular course. The Dissecting Room is large, well ventilated and lighted, and the Demonstrator of Practical Anatomy passes much of his time in assisting the students and directing their labors. **Dissecting Material is furnished in abundance, free of charge.**

Qualifications for Graduation: The candidate must be twenty-one years of age, and have attended two full courses of lectures at the **Regular** or Winter Session in this institution. The following, however, will be considered as an equivalent to an attendance on one course of lectures in this College:—One course in any reputable Dental or Medical College, prior to matriculation in this College; five years' Dental Practice, including regular pupilage; a satisfactory examination on entering College. The student meeting either of the above requirements will have the privilege of presenting himself as a candidate for graduation at the end of but one Course of Lectures.

Graduation in Medicine: Graduates of the Dental Department of the University of Maryland are required to attend but **one session** at the University School of Medicine prior to presenting themselves as candidates for the degree of "Doctor of Medicine." [See catalogue].

The **Regular** or **Winter Session** will begin on the 1st day of October, 1883, and will terminate about the 1st of March, 1884.

The **Summer Session,** for practical instruction, will commence in April, 1883, and continue until the regular Session begins. Students in attendance on the Summer Session will have the advantages of all the daily Surgical and Medical Clinics of the University.

The fees for the Regular Session are $100, Demonstrators' Fees included; Matriculation Fee, $5; Diploma Fee, for candidates for graduation, $30; Dissecting Ticket, $10.

For Summer Session, no charge to those who attend the following Winter Session.

Beneficiary.—A Beneficiary student will be received from each State, on the recommendation of the State Dental Society, on the payment of half of the tuition fees. Board can be obtained at from $3.50 to $5 per week, according to quality.

The Faculty Prize and a number of other Prizes will be specified in the annual Catalogue.

Students desiring information and the annual Catalogue will be careful to give full address and direct their letters to

F. J. S. GORGAS, M.D., D.D.S.,

Dean of the Dental Department of the University of Maryland.

259 N. Eutaw Street, Baltimore, Md.

SCOTT'S DISKS AND RETAINERS.

Made of Pure Para Gum, cannot possibly injure the mouth, will not become offensive, and will last from one to three years. Prices below include all necessary fixtures, instructions and right to use. Sold by all Dental Depots.

Disks for Upper Sets	per dozen	$2.00
Retainers for Lower Sets	per dozen pairs	3.00
Trial box—two Disks and two pairs Retainers		1.00

Remit by Post-office Money Order or Draft on New York.

Mrs. Dr. Quincy A. Scott, 284 Penn Ave., Pittsburgh, Pa.

DENTAL COSMOS FOR APRIL, 1883, WANTED.

We will pay 25 cents each for a limited number of copies of the Dental Cosmos for April, 1883, if sent to us in good, salable condition.

The name and address of the person sending copies in response to this advertisement should be placed upon the wrapper as a means of identification.

FOR SALE.

My dental office in the State of Pennsylvania. Practice, $2400 a year; varies from $180 to $260 a month. Nearly everything as good as new. Will sell for $450, less than things in office are worth. Population of this and adjoining town, over 5000. No other office here. Reasons for selling, poor health and would practice medicine. If I do not sell, would take a partner.

Address, "C. M. J.,"

Care Dental Cosmos, Philadelphia.

PHILADELPHIA DENTAL COLLEGE

AND

HOSPITAL OF ORAL SURGERY.

The regular Winter Term of this institution begins yearly October 1, and continues until March 1.

A Spring course, commencing March 1, and terminating June 1, designed particularly to take the place of private preceptorship, and peculiarly adapted to the needs of young men entering on professional life, has become a prominent feature in this college. Each day, during the entire session, from 12 to 2 o'clock, class papers composed on given subjects by individual students are read before and criticised by the class, members of which are expected to prepare themselves for the discussion. Practical dentistry, clinical surgery, and lectures by the professors occupy the remainder of the hours from 8 A.M. to 6 P.M.

A Fall Term holds from September 1 to October 1; the instruction is alike with that pertaining to the Spring course.

HOME STUDY. Particular attention is directed to the existence of a PRELIMINARY READING COURSE, the object of which is the preparation of proposed matriculates. A course of home reading and study, in membership with this class, and under direction of syllabi furnished, continued for one or more years before coming to college will be found invaluable as a means of preparation. The card of membership can be taken out by mail; the fee is $5.00.

FEES.

For the Courses of Whole Year	$100.00
For the Winter Course alone	100.00
For Spring and Fall Courses alone	50.00
Matriculation	5.00

A Yearly Announcement is published, affording all particulars relating to the college, which is to be had by directing postal to the Dean,

J. E. GARRETSON,

1537 Chestnut Street, Phila., Pa.

UNIVERSITY OF PENNSYLVANIA.

DENTAL DEPARTMENT.

FACULTY.

William Pepper, M.D., LL.D., Provost of the University, and *ex-officio* President of the Faculty.

Charles J. Essig, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy.

Edwin T. Darby, M.D., D.D.S., Professor of Operative Dentistry and Dental Histology.

James Truman, D.D.S., Professor of Dental Pathology, Therapeutics, and Materia Medica.

Joseph Leidy, M.D., LL.D., Professor of Anatomy.

Harrison Allen, M.D., Professor of Physiology.

Theodore G. Wormley, M.D., LL.D., Professor of Chemistry.

Robert Huey, D.D.S., Lecturer on Operative Dentistry.

Students of the Dental Department have access, without additional charge, to all the other lectures and clinics in the Medical Department.

Surgical Clinics at University Hospital twice a week; at Philadelphia Hospital, contiguous to grounds of University, Wednesday and Saturday.

DEMONSTRATORS.

William Diehl, D.D.S., Demonstrator of Operative Dentistry.

Wm. Lewis Cave, D.D.S., Demonstrator of Mechanical Dentistry.

Stephen L. Wiggins, D.D.S., Assistant Demonstrator of Operative Dentistry.

J. J. Edwards, Assistant Demonstrator of Mechanical Dentistry.

Charles T. Hunter, M.D., Demonstrator of Anatomy.

John Marshall, M.D., Demonstrator of Practical Chemistry.

CLINICAL INSTRUCTORS.

Dr. C. S. Beck.	Dr. Geo. B. McDonald.	Dr. R. H. Shoemaker.
Dr. Louis Jack.	Dr. W. R. Millard.	Dr. R. R. Underwood.
Dr. Geo. W. Klump.	Dr. E. H. Neall.	Dr. I. F. Wardwell.
Dr. H. C. Longnecker.	Dr. H. C. Register.	Dr. J. A. Woodward.

The appointments of the Lecture-Rooms, Operating-Room, and Laboratories are the most complete in America.

The belief entertained when the Dental Department was started that the facilities for obtaining a supply of clinical patients were ample, has been fully realized, and owing to the unequaled accommodations and appointments of the new operating-room, the daily applications are now largely in excess.

Laboratory instruction of each student, not only in Practical Dentistry but also in Practical Chemistry, forms a prominent feature in the Department of Dentistry.

FEES.

Matriculation Fee	$5.00	Dissecting Fee	$10.00
Fee for One Course of Lectures	100.00	Graduation Fee	30.00

Two years' study, attendance upon two courses of lectures, and examination at the end of second course are required for graduation.

Students who have attended one course of lectures in any other Dental or Medical School in good standing, may be examined for the degree of D.D.S. (Doctor of Dental Surgery) after attending a single course of lectures.

UNIVERSITY OF PENNSYLVANIA.

DENTAL DEPARTMENT.

The dental department possesses the means for thorough training, both theoretical and practical, not surpassed, it is believed, by any other institution. The operating-room is 151 feet in length by 46 feet in width, and lighted by windows on all sides. In front of each window is placed a Morrison Chair, a handsome nickel-plated movable bracket, and a neat walnut table. Battery-wires are arranged to a number of the chairs for the use of electric pluggers.

The Mechanical Laboratory is supplied with all the modern appliances, and is under the care of an able and experienced mechanician. Special clinics will be given in continuous-gum work by the professor of mechanical dentistry and metallurgy.

The extensive Chemical Laboratories are under the charge of a demonstrator well qualified to meet all the requirements of his position.

The Dissecting-Room is large, well lighted, thoroughly ventilated, and is furnished with ample material for the successful prosecution of anatomical studies.

THE REGULAR OR WINTER SESSION.

The session will commence on Monday, October 1, and continue until the last of April. The number of lectures per week, with a synopsis of the various branches taught, will be found on pp. 85 and 86 of the General Catalogue.

In order to facilitate work in the practical departments, and to fully employ the student's time, the regular winter sessions are so arranged that the first-course student is required to devote the morning hours equally between *dental and chemical laboratory work.* At the end of the first session he is examined in chemistry and materia medica, when, if qualified, he passes into the second class.

The second-year student, having passed in those two branches, is not required during his second course to attend the lectures upon them; thus he has the entire forenoon of each day for practical dental work.

It is the desire of the Faculty to offer every opportunity for the acquirement ot practice in operative and mechanical dentistry, and as many large operations in the mouth require the morning light, and more time in their performance than an afternoon affords, permission will be given to the second-course student to devote the morning hours to this object when required.

It is believed that this plan of *grading the course*, and of affording the first-year student an opportunity of coming forward for examination in the branches of chemistry and materia medica, will not only prove an economical arrangement of his time, but will really facilitate his labors in the acquirement of knowledge in the remaining branches.

GRADUATION IN MEDICINE.

Dental students wishing to take the degree in Medicine also, *can do so* in three years from the beginning of their studies; *but candidates must notify the Secretary of the Department of Medicine of such intention before the beginning of the second course of lectures.* They then must add to their studies of the second year which they would take as students of dentistry, Medical Chemistry, Topographical Anatomy, General Pathology and Morbid Anatomy, Therapeutics, Theory

and Practice of Medicine, Surgery, and Obstetrics, with Clinics medical and surgical. At the end of this year they are examined in Medical Chemistry, Anatomy, and Physiology, together with the dental branches proper, when, if qualified, they receive the degree of D.D.S., and pass on to the third year in medicine.

To such graduates the spring course is open for practice at the chair, or in the dental laboratory, free of additional charge.

In the third year they take the studies of the third-year medical students, as laid down in the Medical Curriculum Catalogue, and at the end of the year pass an examination in Therapeutics, General Pathology and Morbid Anatomy, Theory and Practice of Medicine, Surgery, and Obstetrics.

PLAN OF EXAMINATIONS.

The first-course student will, at the end of the term, be required to pass a *final examination in Chemistry and Materia Medica*, and, if successful, he enters the second-year class. If, however, he is not qualified, *a second examination* is afforded him at the beginning of the next regular course (October 1).

The final examination of the second-course student will be in Anatomy, Physiology, Operative Dentistry, Mechanical Dentistry, Metallurgy, and Dental Pathology.

Matriculates who have attended one full term in another dental or medical school of good standing, will be admitted as students of the graduating class. No preliminary examinations are demanded.

JAMES TRUMAN, D.D.S.,
Secretary of the Dental Faculty, 1513 *Walnut Street*,
PHILADELPHIA.

In directing letters addressed to this department, correspondents are requested to write the word Secretary (not Dean) under the name.

STUART & ADAMS.

SOUTHERN DENTAL DEPOT,

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All kinds of Dental Material kept, Cologne, Tooth-Powder, and Mouth Wash.

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THE S. S. WHITE DENTAL MFG. CO., OF PHILADELPHIA.

Pennsylvania College of Dental Surgery.

Twelfth Street, between Market and Arch, corner of Filbert.

Twenty-eighth Annual Session, 1883-84.

FACULTY.

J. EWING MEARS, M.D., Professor of Anatomy and Surgery.

C. N. PEIRCE, D.D.S., Professor of Dental Physiology, Dental Pathology, and Operative Dentistry.

HENRY C. CHAPMAN, M.D., Professor of Physiology and General Pathology.

WILBUR F. LITCH, M.D., D.D.S., Professor of Mechanical Dentistry, Materia Medica, and Therapeutics.

HENRY LEFFMANN, M.D., Professor of Chemistry and Metallurgy.

J. N. FARRAR, M.D., D.D.S., F. M. DIXON, D.D.S., } Lecturers on Operative Dentistry.

EBEN M. FLAGG, D.D.S., Lecturer on Mechanical Dentistry.

ALONZO P. BEALE, D.D.S., Demonstrator of Mechanical Dentistry.
PERCIVAL E. LODER, M.D., Demonstrator of Anatomy.
J. M. BARSTOW, D.D.S., Demonstrator of the Carving of Block Teeth and Continuous-Gum Work.
WM. REEDER, D.D.S., Demonstrator of Operative Dentistry.
W. S. HOKE, D.D.S., Demonstrator of Operative Dentistry.
CHARLES HARKER, D.D.S., Demonstrator of Operative Dentistry.
A. G. BENNETT, D.D.S., Demonstrator of Operative Dentistry.
F. R. NEWCOME, D.D.S., Assistant Demonstrator of Mechanical Dentistry.
I. N. BROOMALL, D.D.S., Assistant Demonstrator of Mechanical Dentistry.

CLINICAL INSTRUCTORS.

Dr. W. G. A. Bonwill.	Dr. C. S. Stockton.	Dr. W. R. Millard.	Dr. Uriah Kirk.
Dr. A. L. Northrop.	Dr. T. F. Chupein.	Dr. Charles F. Bonsall.	Dr. E. C. Baxter.
Dr. C. Palmer.	Dr. W. H. Trueman.	Dr. John B. Wood.	Dr. A. H. Brockway.
Dr. R. H. Shoemaker.	Dr. J. Hayhurst.	Dr. C. E. Francis.	Dr. A. B. Abell.
	Dr. J. G. Templeton.		

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

In the arrangement of the College building no expense has been spared in providing every facility for complete instruction in the Science and Art of Dentistry. A large Lecture-Room and a large Ampitheatre have been arranged with great regard to the comfort of the classes.

The arrangements of the Operating-Room and Mechanical Laboratory are unequaled by any other College in the country. High ceilings, with numerous and large windows, supply an abundance of light, and afford the best ventilation.

A suitable room has been provided for the Museum of the College, recently enriched by purchases and donations.

The Dissecting-Room, a large and well-ventilated apartment, has been fitted up with especial reference to the comfort and convenience of the students.

The Chemical Laboratory is arranged so as to afford the students ample opportunities for practical work in chemistry and metallurgy *without extra fee.*

The Infirmary, Mechanical and Chemical Laboratories, and Dissecting-Room will remain open during the entire sessions, where ample opportunities are afforded the student for the prosecution of the practical part of his studies under the instruction of Demonstrators of known integrity and capability. During the Fall Course and Regular Winter Session, Clinical Lectures will be given and operations performed by the Professors. *The Surgical Clinic for the treatment of the Diseases, Injuries, and Deformities of the Jaws is held each Wednesday, at* 12 M., *by the Professor of Anatomy and Surgery.*

THE SPRING AND FALL SESSION.

The Spring Course of Lectures will commence on the third Monday in March and continue until the first of June. Fee for the course, $50, which will be credited upon the fee for ensuing regular session.

The Fall Course will commence on the first Monday in September, and continue until the first day in October, and will be free to those who matriculate for the regular session.

Attendance at the Spring and Fall Courses will be deemed equivalent to the term of pupilage under a private preceptor during the recess of the regular sessions. *In the Spring and Fall Sessions the lectures are delivered by the Professors.*

THE REGULAR SESSION

Will commence on Tuesday, October 2, and continue until the first of March ensuing. The course is so arranged that twenty lectures will be delivered each week on the various branches taught in the College.

GRADUATION IN MEDICINE.

Owing to the great advances made in the methods of instruction, the Faculty have been able to arrange with Jefferson Medical College so that students of this College can have the two degrees, in Dentistry and Medicine, in *three* years. Those students desiring to graduate in medicine are requested to notify the Dean of their intention at the beginning of their second course.

FEES.

Matriculation (paid but once)	$5.00
For the Course (Demonstrators' Ticket included)	100.00
Dissecting Fee (optional)	10.00
Diploma	30.00

For further information, address

C. N. PEIRCE, Dean, 1415 Walnut St., Philadelphia.

Board can be obtained at from $4.00 to $6.00 per week.

All the Instruments and Tools required can be procured for from $30 to $35.

Members of the Profession having Specimens of peculiarities of Development or unusual Pathological Conditions, Models of Irregularities as to position in the Natural Teeth, etc., etc., who will be good enough to send the same by mail or otherwise to Professor C. N. Peirce, Dean, 1415 *Walnut St., Philadelphia, Pa., will receive suitable acknowledgment and thanks for the same, and the specimens will be nicely mounted, with the donor's name attached, and deposited in the College Museum.*

UNIVERSITY OF CALIFORNIA.

DENTAL DEPARTMENT,

STOCKTON ST., CORNER OF FRANCISCO ST., SAN FRANCISCO, CAL.

FACULTY.

W. T. REID, A.M., President of the University and *ex-officio* President of the Faculty.
A. F. McLAIN, M.D., D.D.S., Professor of Dental Pathology and Therapeutics.
S. W. DENNIS, M.D., D.D.S., F.R.M.S., Professor of the Principles and Practice of Operative Dentistry and Dental Histology.
C. L. GODDARD, A.M., D.D.S., Professor of Mechanical Dentistry.
M. W. FISH, M.D., Professor of Physiology.
A. L. LENGFELD, M.D., Professor of Chemistry.
WILLIAM LEWITT, M.D., Professor of Anatomy.
W. E. TAYLOR, M.D., Professor of the Principles and Practice of Surgery.

DEMONSTRATORS.

M. J. SULLIVAN, D.D.S., Demonstrator of Operative Dentistry.
J. W. EDWARDS, Demonstrator of Mechanical Dentistry.
W. B. LEWITT, M.D., Demonstrator of Anatomy.
E. O. COCHRAN, Demonstrator of Continuous-Gum Work.

CLINICAL INSTRUCTORS.

F. W. BLISS, D.D.S.
H. C. DAVIS, L.D.S.
L. L. DUNBAR, D.D.S.
R. W. HENDERSON.
WM. B. KINGSBURY.
H. E. KNOX, D.D.S.
J. A. W. LUNDBORG.
H. J. PLOMTEAUX, D.D.S.
MAX. SICHEL.

Surgical and Medical Clinics are held at the Hospitals three times a week.

The Lecture-Rooms, Operating-Rooms, and Laboratories are commodious, and their appointments complete.

The Preliminary Course of Lectures of the second year will commence March 2, 1883, and continue two months. The Regular Course will commence June 1, 1883, and continue till October 31.

Students may matriculate at any time, but a preliminary examination will be required of all matriculates after June 1, 1883.

Two years' study, attendance upon two courses of lectures, and examination at the end of the second course are required for graduation.

Students who have attended one course of lectures at any other Dental School in good standing, and Dentists of seven years' practice may be examined for the degree of D.D.S. after attending a single course of lectures.

Graduates of medicine may apply for the degree of D.D.S. upon attending one full year.

FEES.

Matriculation Fee (paid but once)	$5.00	Demonstrators' Fees	$30.00
Tuition	100.00	Diploma Fee	30.00

For further information, address

C. L. GODDARD, Dean,

200 Post St., San Francisco, Cal.

N. B.—Boarding. The expense of living in the city of San Francisco is not great. Good board with room-rent may now be procured at the low rate of $5.00 per week, at a convenient distance from the college building. Students from a distance may learn the address of these boarding-houses and other information by calling on the Dean of the Faculty.

1845. 1883.

OHIO COLLEGE OF DENTAL SURGERY.

CINCINNATI, OHIO.

This Institution is *preeminently a School of Dentistry.* The property is owned and controlled by an association of dentists numbering nearly one hundred. The college building was erected and is used exclusively for the purposes of dental education. The Faculty is composed of dentists in actual practice, whose purpose it is to give a thorough course of instruction in the theory and practice of dentistry. To this end the Lectures in all the branches taught, including Anatomy, Surgery, Physiology, Pathology, Materia Medica, and Chemistry, are arranged with a view to thoroughly qualify the student to *practice the profession of dentistry.*

Recognizing the value of clinical instruction to the dental student, the regular Course of Lectures will be supplemented by a thorough course of training in the Infirmary and Laboratory, under the direction of the professors and demonstrators. Clinics for instruction in Practical Dentistry will be given in the College Infirmary each afternoon (except Sundays) during the entire session.

Cincinnati, through the medium of her numerous educational establishments for the promotion of the arts and sciences, her hospitals, dispensaries, libraries, public and private lectures, etc., affords superior advantages for a thorough education in any of the branches of the healing art. The large manufacturing interests of the city, which give direct employment to over one hundred thousand persons, makes the location of the Ohio College of Dental Surgery especially favorable for teaching practical dentistry. This large population furnishes the greatest variety of cases for clinical instruction, and a supply of patients in excess of the demand for practice in the College Infirmary.

The Thirty-eighth Annual Session will begin the first day of October, 1883, and continue till March following.

For information regarding fees, terms of graduation, etc., address,

H. A. SMITH, D.D.S., Dean,

286 Race Street, Cincinnati.

Harvard University, Dental Department.

BOSTON, MASS., 1883-84.

FACULTY.

CHARLES W. ELIOT, A.M., LL.D., President.
THOMAS H. CHANDLER, A.M., D.M.D., Dean and Professor of Mechanical Dentistry.
DAVID W. CHEEVER, M.D., Professor of Surgery.
HENRY P. BOWDITCH, M.D., Professor of Physiology.
THOMAS DWIGHT, M.D., Professor of Anatomy.
THOMAS FILLEBROWN, M.D., D.M.D., Professor of Operative Dentistry.
EDWARD S. WOOD, A.M., M.D., Professor of Chemistry.
CHARLES A. BRACKETT, D.M.D., Professor of Dental Pathology and Therapeutics.
MAURICE H. RICHARDSON, M.D., Demonstrator of Practical Anatomy.

OTHER INSTRUCTORS.

GEORGE F. GRANT, D.M.D., Demonstrator of Mechanical Dentistry.
TIMOTHY O. LOVELAND, D.M.D., Instructor in Operative Dentistry.
CHARLES WILSON, D.M.D., Instructor in Operative Dentistry.
ALBERT B. JEWELL, D.M.D., Instructor in Operative Dentistry.
EUGENE H. SMITH, D.M.D., Instructor in Operative Dentistry.
JOSEPH W. WARREN, M.D., Instructor in Oral Pathology and Anatomy.
EDWARD C. BRIGGS, M.D., D.M.D., Instructor in Operative Dentistry.
VIRGIL C. POND, D.M.D., Demonstrator of Operative Dentistry.

The Sixteenth Annual Session of this school begins Sept. 27, 1883, and ends June 26, 1884, with a recess of one week at Christmas, and another in April, making a school-year of nine months of practically continuous work.

General Anatomy, by Dr. Thomas Dwight; *Physiology*, by Dr. H. P. Bowditch; and *General Chemistry*, by Dr. E. S. Wood, and his able assistant, Dr. Wm. B. Hills, together with ample dissecting under able demonstrators, are the studies of the first year, the dental students taking the whole first-year course of the Harvard Medical School, which is acknowledged to be the most thorough medical course in America. The studies for the second year are Operative and Mechanical Dentistry, Dental Materia Medica and Therapeutics, Oral Surgery, and Surgical Pathology. Other studies are optional, the student having the privilege of attending, without additional charge, the instruction given in *any other* department of the University, with the exception of the exercises carried on in special laboratories. Attention is called to the fact that *eighteen months* of progressive instruction compose the required two years in the school, more than double that given in some, and nearly twice that of any other school in the world, at only a slightly-increased expense. Also, that the second year does not repeat the work of the first, but covers entirely different ground. In other schools the work of the second term is usually a repetition of that of the first.

In the Operative and Mechanical Departments measures are taken to keep fully abreast of the times, the great number of patients who apply for operations giving full opportunity to the student for practicing and becoming familiar with every phase of dentistry. Lectures and abundant clinics furnish the theory of his profession, while able assistants and demonstrators watch every step of his progress, aiding where help is needed, and advising where advice only is called for. The Infirmary of the Massachusetts General Hospital furnishes abundant facilities for operations; there is a fine, well-lighted laboratory for mechanical work, and a large city guarantees ample material for both.

At the end of each year written examinations test the student's knowledge and he must pass satisfactorily in a majority of the first-year studies before he can pass on to the second year's class.

To those wishing to take the medical degree the first year of this school is allowed in the Medical School of the University, after passing the required entrance examinations, and also in every other medical school in the land.

The University Degree, D.M.D. (*Dentariæ Medicinæ Doctor*), is conferred upon all who fulfill the requirements.

The diploma is accepted by the English Board of Registration under the new Dental Act, so that graduates of this school can practice dentistry in Great Britain without further examination.

Graduates of recognized dental schools will be admitted to the courses of Operative and Mechanical Dentistry on payment of $50 each, or $100 for both, for the whole or any portion of the academic year.

FEES.

There are no fees for matriculation, nor for the diploma, nor for the demonstrators. For the first year a student is a member of the school the fee is $200, payable in two installments of $120 and $80; for the second year, $150, in two payments of $100 and $50; for any subsequent year, $50. For information, address

THOMAS H. CHANDLER, Dean,
No. 74 Commonwealth Avenue, Boston, Mass.

NEW YORK COLLEGE OF DENTISTRY.

1883-84.

FACULTY.

FANEUIL D. WEISSE, M.D., Professor of Regional Anatomy and Oral Surgery.

FRANK ABBOTT, M.D., Professor of Operative Dentistry and Dental Therapeutics.

ALEX. W. STEIN, M.D., Professor of Visceral Anatomy, Physiology, and Histology.

F. LEROY SATTERLEE, M.D., Ph.D., Professor of Chemistry and Metallurgy.

J. BOND LITTIG, D.D.S., Professor of Mechanical Dentistry.

CLINICAL STAFF.

JOHN ALLEN, D.D.S.	WM. T. LAROCHE, D.D.S.
WILLIAM E. HOAG, D.D.S.	J. F. P. HODSON, D.D.S.
DOMINGO M. SABATER, D.D.S.	H. W. F. BÜTTNER, D.D.S.
DANIEL A. WILLIAMS, D.D.S.	A. EUGENE RAISBECK, D.D.S.

LECTURERS.

CARL HEITZMANN, M.D., Lecturer on Dental Histology.

FRANK W. JACKSON, M.D., Lecturer on Chemistry.

F. HASBROUCK, D.D.S., Lecturer on Nitrous Oxide.

DEMONSTRATORS.

KARL J. MILKE, D.D.S.	DAVID K. REINHOLD, D.D.S.
HENRY H. SISSON, D.D.S.	HENRY V. WOLLISON, D.D.S.

DOMINGO M. SABATER, D.D.S., Supt. of the Operative Department.

DANIEL A. WILLIAMS, D.D.S., Supt. of the Mechanical Department

Students may matriculate at any time, as the Infirmary is open for regular students of the College to practice in the entire year.

The Regular Course of Lectures will commence on Monday, October 1, and continue until the latter part of February. Three hours of each day of the week (except Saturday) will be devoted to Lectures, and four hours to *Clinics* and practice at the Chair and in the Laboratory, under the direction of the Demonstrators.

With increased and greatly-improved accommodations in the Infirmary and Laboratory, we now offer to students most extensive and perfect practical facilities for acquiring an education.

FEES.

Matriculation	$5.00
Course of Lectures—Winter	100.00
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SIXTEENTH ANNUAL SESSION, 1883-84.

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